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EDITORIAL NOTE

of Dr Rischbieth which has prevented him from replying to business letters sent to him, the part of this section which is due in a form which has received his final approval. The Editor has made many corrections and additions, beyond the footnotes in brackets. Historical and bibliographical references have been supplied by the Staff Laboratory, which is wholly responsible for the Bibliography, the Iconography, and the plates, a large section of the photographic illustrations and all the family portraits on six out of the eight pedigree plates. The Editor regrets this divided responsibility, but a large proportion of the text of Dr Rischbieth's contribution was in type before we were deprived of his assistance and it did not seem possible without cancelling the portion already in type to obtain other and adequate medical aid. The Laboratory Staff has done its best to complete this important section, but the Editor realises that this account of Dwarfism lacks something of unity and completeness owing to the circumstances of its production. He has most heartily to thank his colleague Professor George D. Thane for much helpful advice and replies to many questions.

K. P.

With these Parts, Vol. I. of the *Treasury of Human Inheritance* is completed. Prefatory matter and a copious Index to the volume will be issued, Price 2s. 6d. (Dulau and Co., Ltd., 37 Soho Square) to those desirous of binding these parts as a single volume. Buckram cases for binding with an impress of Sir George Frampton's bust of Francis Galton can be obtained by sending a postal order for 2s. 9d. to the Hon. Secretary of the Eugenics Laboratory, University College, London.

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SECTION XV. DWARFISM.

By H. RISCHBIETH, M.A., M.D., B.C. Cantab., F.R.O.S. Eng.

I. INTRODUCTION.

The term "dwarf" (German "Zwerg," French "nain") is a general one applied to individuals markedly below the average height of the species. There are dwarf races (ethnic dwarfs) and dwarf individuals in normal races; amongst the latter dwarf growth appears usually to be the effect of disease.

We are here concerned with the heredity of dwarf growth the result of disease (that is, with those varieties of the group which show this influence in causation clearly at the present day), but in order that the relationships of members of this group to others be preserved, a short reference to ethnic dwarfs will perhaps be permitted though the subject belongs to anthropology, not pathology. Dwarf races seem to have been mentioned in the literature and legends of most languages. The Greek and Latin writers refer frequently to dwarf races¹. In modern European languages legends of dwarfs or pygmies, fairies, pixies, cobbolds and Nibelungs are

[¹ The word pygmy (πυγμαί) signifies the length from elbow to knuckles, although it is not clear that it has not sometimes been used in the sense of cubit, rather than of 18.5". Homer (*Il.* 900 B.C. ?) refers in the opening sentences of the *Iliad*, Book III. to the legends of the war between cranes and pygmies. Herodotus (*fl.* 448 B.C.), Book III. Chap. 37, says that the "image of Hephaestus at Memphis was in form resembling a pygmy." Rawlinson (Vol. II. p. 484) commenting on this passage gives good illustrations of the pygmy figures of Ptah-Sokar found in Egypt, one at least being of achondroplastic type (see also our Plate S (14)). While the Greeks in the best period represented Hephaestus as a vigorous man, they still placed dwarf-like statues of this god near the hearth, and he was said to be lame and weak from birth. This legend must be considered in line with others that attribute metal and smith's work to the dwarfs. Ctesias (*fl.* 401 B.C.) places a race of pygmies in India, and asserts that their oxen and asses are of the size of rams (*Operum reliquiarum*, ed. Baehr, 1824, p. 293; Baehr commenting on Ctesias, while admitting that Ctesias only heard Indian stories at second-hand, refers to travellers' tales of men and horses of small stature in India and considers that a dwarf race cannot be dismissed as wholly fabulous). Aristotle (*fl.* 347 B.C.) refers on two occasions to dwarfs. In the *Probl. Sect.* x. 14 he considers the origin of the *vānos*. This word signifies really one whose limbs are too small for his body, and should refer to the achondroplastic and not the true dwarf; Aristotle suggests as causes, locality, nourishment and heredity. In the *Hist. Animalium*, VIII. 12, Aristotle refers to the cranes changing their dwelling from the Scythian plains to the low ground by the rivers of Upper Egypt, and speaks of their attacking the pygmies. He asserts that this is no mere tale, but there is really a small race, both of men and horses, and that the pygmies live in holes. Strabo (*fl.* 24 B.C.) refers in his *Geographica* at several points to the legends of the pygmies and mentions Homer and Hesiod (a search through Hesiod has not provided any evidence) as speaking of them (Lib. I. Cap. II. 28, 30 and 35, Lib. VII. Cap. III. 6). Lib. I. Cap. XXXV. places them in Aethiopia. Lib. II. Cap. I. 9 refers to their Homeric fight with the cranes, and Strabo tells us that writers about India mention pygmies. In Lib. XVII. Cap. II. 1 he states that the smallness of the Aethiopian cattle probably suggested pygmies, "whom nobody worthy of credence has seen." Pomponius Mela (*fl.* 50 A.D.) places (*De Situ Orbis*, Lib. III. Cap. VIII. 1. 71) the pygmies towards the source of the Nile ("Fuere interius Pygmaei, minutum genus, et quod pro satis frugibus contra grues dimicando deficit"). Pliny (*fl.* 59 A.D.) in his *Natural History*, Bk. VII. Chap. II. places the *Pygmaei Spithamei*—the span-high pygmies—far up in India above the sources of the Ganges, on the skirts of the mountains, and he makes them 27" in stature. He quotes Homer's account, and says that they make their homes of clay or mud, birds' feathers and egg-shells, but notices Aristotle's statement that they live in holes. In Bk. VI. Chap. XXX. Pliny also refers to the pygmies at the source of the Nile. Aulus Gellius (*fl.* 140 A.D. Lib. IX. Cap. IV.) is of opinion that Pliny's statements about the pygmies are idle. Aelianus (*fl.* 150 A.D.), *De Nat. Animal.*, mentions dwarf animals in India and Africa (xvi. 37). Elsewhere (xv. 29) he says that the pygmies had a kingdom of their own and were governed by a queen Gerana, who, when divine honours were paid to her, became inflated and despised the goddesses themselves, saying that their figure would not compare with hers. Juno changed Gerana into a crane (γέρανος), which bird is always at enmity with the pygmies because they brought infamy upon her owing to their excessive honours. Philostratus (*fl.* 260 A.D.) relates in his *Iconum Lib. Sec.* Cap. XXII. how Hercules fell asleep and how while sleeping he was attacked by armies of pygmies. He collected them all in his lion's skin and took them to Eurystheus. Ovid (*fl.* 18 B.C.) refers in his *Metamorphoses*, Lib. VI. 90—8, to the Juno and Gerana incident. Besides these references stretching over a thousand years to dwarf races—in districts where races of small stature have existed till modern times—there are one or two references to individual dwarfs. Thus Suetonius (*fl.* 110 A.D.) gives such in *Caes. Octavius Augustus*, Cap. 48, l. 820, Cap. 88, ll. 422—5. In the former passage he mentions a Roman knight Lucius "postea nihil sane, praeferquam adolescentem Lucium, honeste natum, exhibuit; tantum ut ostenderet, quod erat bipedali minor, librarum septemdecim, ac vocis immensae." The commentators are doubtful whether the name of this knight was Lucius. A dwarf of like stature appears to be referred to by Horace, Lib. II. Sat. III. l. 809. In Lib. I. Sat. III. 45, the same writer mentions Mark Antony's dwarf, Sisyphus, said to be under 2 ft. high, but very witty, and taking his name from his dexterity and cunning. Our Plate S (14) shows that the Romans were familiar with achondroplastic dwarfs. Edward Tyson published in 1699 a work entitled: *Orang Outang sive Homo Sylvestris, or the Anatomy of a Pygmy*. It is followed by a very learned essay on the pygmies of the ancients, whom Tyson believed to have been apes. This essay was republished in 1894 in the *Bibliothèque de Carabas*, Vol. IX. See Bibl. No. 15 and 294. For the folklore side of dwarfism, Cap. XVII. of J. Grimm's *Deutsche Mythologie* (Augs. 1875, S. 869 et seq.) is still unexcelled. EDITOR.]

familiar. Dwarf races have been reported or fabled to exist in the Canary Islands (van Helmont, 17th century), on the Orinoco (Humboldt), in Abyssinia, Brazil, Japan and India (Wood, Bibl. No. 138, p. 245). Buffon¹ refers to a report of a dwarf race in Madagascar; this may have been merely a legend. But Schweinfurth, the African traveller, confirmed the statements of the ancient Greeks and later voyagers and travellers² that a race of dwarfs existed at the source of the Nile by finding representatives of such a race at the Court of King Munza at Monbuttou in 1870, and to them he applied the name "Akka". In Sir H. M. Stanley's last expedition another tribe of dwarf negroes was found near Ruwenzori³. It is now known that dwarf races (negrillos) exist in many parts of Central Africa, and in South Africa as the Bosjesman, or Bushman, they have long been known. The negrillos have since received much attention from anthropologists, amongst them Virchow. Such a race or its traces also occurs in Southern Asia—in the Andaman Islands, Malay Peninsula, Philippine Islands, Borneo, New Guinea—the Negrittos⁴. These are regarded as of allied race to the negrillos of Africa.

The average height of the "Akkas" as given by de Quatrefages de Breau is:—men, 1 m. 50 to 52 cm. (4 feet 11 ins. approximately); and women, 1 m. 40 to 43 cm. (4 feet 7 ins. approximately). Haliburton⁵ has reported the presence of a dwarf race in the Pyrenees, in the Atlas Mountains and in North America. With dwarf races such as the Negrillos such comparatively small races as the Laplanders, Eskimos and Japanese seem analogous. In Europe the excavations of ancient burial-grounds by Nuesch, Kollmann, Manouvrier, and others, appear to show the existence of a dwarf race contemporary with the Romans. The last of the dwarf races is believed to have disappeared from Europe about the 10th century.

The bearing of these facts concerning the wide distribution (either formerly or at the present day) of dwarf races upon the subject of pathological dwarf growth seems important, more especially with reference to varieties of the latter that show heredity in causation. There is, as is well known, amongst the proletariat of European cities and elsewhere, a great group of very undersized individuals. These are said to be especially common in Bavaria and in Italy. Are these survivals of an old dwarf race, or are they the product of disease or other factors of their environment? The pure ethnologist may possibly have one opinion and the pure pathologist another. Again, it seems possible that some of the instances that have been reported of racial dwarfism are really instances of disease: *e.g.* one of Haliburton's cases, to judge from the illustration and account, appears to be an instance of ateleiosis occurring in several members of a family. In mountainous regions such as the Pyrenees or Atlas

¹ *Supplément à l'Histoire naturelle*, T. iv. pp. 505—12, Paris, 1777. A. Grandidier (*Histoire physique, naturelle et politique de Madagascar*, T. i. pp. 652—54, Paris, 1908) discusses the legend at length, but considers no evidence for a pygmy race forthcoming.

² Dapper's account (*Naukeurige Beschrijvinge...*, Amsterdam, 1676, pp. 166, 216—8) of the Bakke-Bakke (? = Akka), or Mimos, a dwarf race in and beyond the Grand Moccoo's kingdom seems definite enough both in locality and habits. Stanley, like Dapper, remarks on the practical invisibility of these dwarf-enemies. Nonnosius' account, both as to locality and habit, is less definite (Photius, *Myriobiblon*, Cod. 2, pm. 7). Thevenot refers to dwarf black slaves from Nubia presented by the King of Abyssinia to the Grand Seigneur (*Voyage au Levant*, Lib. ii. c. 68). See Bibl. Nos. 12 and 18.

³ See Bibl. No. 148.

⁴ See Bibl. Nos. 259 and 260.

⁵ See de Quatrefages, *The Pygmies*, London, 1895; also R. B. Bean, *American Anthropologist*, Vol. xii. p. 220, and D. P. Barrows, *Ibid.* Vol. xii. p. 355, 1910.

⁶ See Bibl. Nos. 306, 309 and 325.

Mountains, cretinism seems liable to be confused with other dwarf conditions. There are certainly cretins in the Pyrenees, but it is stated that there are other dwarfs as well. Some confusion in this respect appears to have been handed on from very early times. Homer and Ctesias certainly had ethnic dwarfs in mind, and Milton also when in *Paradise Lost*, Book I. lines 575 and 576, he refers to "that small infantry, warred on by cranes"; Milton had undoubtedly Homer's and probably Philostratus' words about a race of pygmies in his thoughts. The Homeric incident¹ has been represented by an ancient Greek artist, and this illustration is reproduced by Garnier in *Les Nains et Géants*, p. 3; the dwarfs are undoubtedly achondroplastic. Though this merely implies that the artist took as his model some dwarf with which he was familiar—which would most probably be achondroplastic—it appears to illustrate the possibility of confusion arising between racial and pathological dwarfism. He might have chosen instead, as a model, an ateleiotic or other dwarf without the marked deformity of achondroplasia, and in that case it would have been difficult to be sure that pathological and not racial dwarfism was represented in this picture. Dwarf races, as they are presumably liable to the same diseases as other races, may possibly have their own instances of pathological dwarf growth.

It has thus only been within comparatively recent times, as a result of exploration of regions hitherto untraversed, and of the increased knowledge of anthropology and ethnology, to a large extent resulting therefrom, that the facts with regard to dwarf races became known and the truth of some old legends was established. This with the increased knowledge of causes, nature and effects of disease has now rendered possible a general classification of dwarf growth, which is at least broadly accurate.

Historical Dwarfs. In order to illustrate the characteristics of dwarfs as individuals, a short account of historical dwarfs will perhaps be permitted, but for a full account the reader is referred to the works of I. Geoffroy-Saint-Hilaire², Wood³, Gould and Pyle⁴ and Garnier⁵, from which the following accounts are largely taken. Amongst "historical" dwarfs several varieties may have been represented. It may perhaps be suspected that some of the dwarfs of the ancients were individuals of dwarf race captured in war, piracy or the slave trade; but others, such as the gladiator dwarfs of Domitian, portraits of which exist, were achondroplastic. In other instances there is no means of judging, exactly, to which group they belonged, though several varieties can in many cases with certainty be excluded (such *e.g.* as cretinism).

In the Bible⁶ it is stated that no dwarf may officiate at the Altar (Lev. xxi. 16—20). In the Museum of Bulak there is an Egyptian statuette, discovered during excavations, of a dwarf named "Knoumhotpu", chief steward of the linen, VIth Dynasty. The Egyptian gods Bes and Ptah-Sokar show a figure which is that of

¹ Some Homeric critics (see Paley, ed. *Iliad*, III. 8) consider the incident as an interpolation; it was familiar to Aristotle, but the legend may have come from Africa between Homer and Aristotle's time.

² See Bibl. No. 75, p. 140.

³ See Bibl. No. 138.

⁴ See Bibl. No. 332.

⁵ See Bibl. No. 205.

⁶ "And the Lord spake unto Moses, saying, Speak unto Aaron, saying, Whosoever he be of thy seed in their generations that hath any blemish, let him not approach to offer the bread of his God. For whatsoever man he be that hath a blemish, he shall not approach: a blind man, or a lame, or he that hath a flat nose, or any thing superfluous, or a man that is brokenfooted, or brokenhanded, or crookbacked, or a dwarf, or that hath a blemish in his eye, or be scurvy, or scabbed," etc.

⁷ Maspero, *Guide to the Cairo Museum*, Eng. edn., 1908, p. 473; reproduced, Porak, Bibl. No. 258.

dwarf growth. (See Plate S (14).) They are undoubtedly achondroplastic. Horus, the child-god, has by some been associated with infantile myxoedema. Denga dwarfs, who could dance "the dances of the gods," were brought from the Soudan, "the land of the gods," into Egypt. On certain vases such dances are depicted, and a royal rescript of about B.C. 3443 refers to a Deng who was a "dancer of god".

During the period of the prosperity of Rome a dwarf was part of the establishment of every noble family. Julia, the daughter of Augustus Caesar, owned two dwarfs, Canopus and Andromeda, each 2 feet 4 inches in height. Mark Antony possessed a dwarf of stature, according to historians, of less than 2 feet, who, it is said, was given the appellation "Sisyphus" (see our p. 355, fn.). There are authentic accounts of the dwarfs of the Emperors Tiberius, Domitian, Alexander Severus and Heliogabalus amongst others. The last-named Emperor caused marriages to be celebrated between the male and female dwarfs of his court. Some of the dwarfs of old were individuals renowned for wit and wisdom; for instance, Philetas¹ of Cos (the tutor of Ptolemy Philadelphus and a distinguished poet and grammarian), Alypius of Alexandria, a subtle dialectician (nicknamed "the pygmy," and said to be 17.5 inches in height!), Licinius Calvus, a celebrated rhetorician (of 3 feet) and Aesop, the author of the famous *Fables* (of about the same height) have been reputed dwarfs. The statue of the young dwarf Lucius, graven by order of Augustus Caesar, has been preserved until the present day². The gladiator dwarfs of the Emperor Domitian are historical. A statuette represents Caracalla in caricature as an achondroplastic dwarf (see Plate S (14)).

Many other accounts of dwarfs have been given by ancient classical authors. Most of them were reported to be of stature from 3 feet 6 inches to 3 feet, or even less. Many such narratives are, however, possibly fabulous. It is said that in the period of deformity that occurred during the decline of the Roman Republic and the first three centuries of the Empire, a trade in dwarfs sprang up, and that the nefarious practice was followed of producing dwarf growth in well-formed infants by means of bandages and instruments designed to retard development. Prescriptions were employed with the same fearful object; such were inefficient feeding by design, with resulting rickets, dwarfing of growth and deformation of limbs. The inunction of the grease of bats, moles, dormice and other animals of the kind that were held to be "under a curse" throughout the "Dark Ages," was credited with the power of retarding growth and was, it is alleged, employed in this gruesome endeavour³. In the 16th century the fashion of dwarfs at Court after the manner of the ancients was revived. Catherine de Medici caused marriages to be celebrated between male and female dwarfs with the object of producing a dwarf race. Such marriages were, however, uniformly barren. Isabella d'Este (1474—1539) built special rooms for her dwarfs, and they may still be seen in the Corte Reale at Mantua (see Lugio, Buffoni, *Nuova Antologia*, 1891).

¹ Petrie, *History of Egypt*, 1908, p. 100. Cf. also Haliburton's excellent picture of dwarf "devil-dancers," Bibl. No. 818.

² Aelianus (*Varia Historiæ*, Lib. ix. c. 14) tells a tale that Philetas weighted his shoes with lead to prevent being blown off his feet in a high wind. Athenæus (xii. 18) gives more credit to the tale than Aelianus.

³ Geoffroy-Saint-Hilaire, Bibl. No. 75, p. 357.

⁴ See Bibl. No. 11.

Charles IX of France, in 1572, owned nine dwarfs: of these four were presented by King Sigismund Augustus of Poland and three by Maximilian III of Germany. This fashion continued until the 18th century. The dwarf had at that time, it would appear, succeeded to the office vacated by the Court jester and was allowed much freedom of speech. Christian II, of Denmark, was imprisoned in the castle of Sonderburg, and his faithful dwarf with him. According to Garnier, probably the last dwarf at the French Court was Balthazar, or Louis Pinson, who died in 1662¹. In 1713, Princess Natalia, sister of Peter the Great of Russia, held a celebration in honour of the marriage of Valakoff, a favourite dwarf, with the dwarf of Princess Prascovia Theodorovna². Such marriages were subsequently forbidden because of the difficulty and dangers of childbirth when pregnancy occurred. In England, France, Spain and other countries portraits of dwarfs were frequently painted by celebrated artists³. "D. Antonio l'Inglese" and "D. Sebastiano de Morra" (an achondroplastic dwarf of Philip IV) by Velasquez, are perhaps the most famous of these, but there are other portraits of dwarfs of the Spanish Court of his time by this master. One of these, "Las Meninas," shows the Infanta Margarita accompanied by the dwarfs Nicolasio Pertuseno and Maria Barbola. The latter and the dwarf called "el Primo" which is also in the Museum of the Prado are achondroplastic. Many dwarfs besides those enumerated have been famous as individuals. This would be not altogether remarkable, if we could assume relative brain weight to measure intelligence; thus in Schaaffhausen's dwarf (see Ateleiosis) the brain weight was one-nineteenth of the total weight as compared with one-thirtieth in the average adult individual of ordinary stature and growth; a somewhat similar relation has been found to occur in some other dwarfs examined post-mortem. Amongst famous men⁴ who have been reputed to be dwarfs are Attila: our sole knowledge is due to Jornandes who describes him as "forma brevis, lato pectore, capite grandiore" (*De orig. Getarum*, see Bibl. No. 10); Characus, said to be of exceedingly small stature but one of the wisest counsellors of Saladin (Wood, Bibl. No. 138, p. 268, no reference given, but see Bibl. No. 27); Gregory of Tours (*fl.* c. 570), was described as a "homuncio" by St Odo (Waller, *Imp. Dict. Univ. Biog.*); Pepin, le Bref (*fl.* c. 750); Charles Durazzo, King of Naples (*fl.* c. 1380), was termed "the small" (*Nouv. Biog. Gén.* 1872); Prince Eugen (*fl.* c. 1700), nicknamed in France "Le petit Abbé"; the Duke d'Altamira, Marquis d'Astorga, president of the Spanish Junta (*fl.* c. 1808), reported by Lord Holland as the smallest man he had ever seen, smaller than many show dwarfs (*Foreign Reminiscences*, Lond. 1850, p. 146: see Bibl. No. 98); Wladislaus "Cubitalis" (1260—1333), King of Poland, called in Polish "Lokietek," the word *lokietc* = ell or cubit, of some renown for intelligence, courage and military qualities (*Nouv. Biog. Gén.* 1872); Godeau (1605—1672), he is said to have been refused in marriage on account of his "petitesse et sa laideur," but Richelieu created him Bishop of Grasse on account of his ability and success in affairs (*Nouv. Biog. Gén.* 1872 and Bibl.

¹ See Bibl. No. 305, p. 114.

² For an account of two marriages of Russian Court dwarfs at which 72 and 98 dwarfs respectively were present: see Bibl. No. 45, S. 524.

³ An *Iconography of Dwarfism*, giving a list of famous pictures, prints, etc., containing dwarfs will be found below.

⁴ The source of the current lists appears to be initially: *Curiosités biographiques. Bibliothèque de Poche*. Paris, 1846; but finally, probably, one of the dissertations of M. F. Quade's pupils—e.g. J. H. Wübbauer: *De viris, statura parvis, eruditione magnis*. Gryphiswaldiae, 1708—or the works cited therein. Editor.]

No. 45, p. 516). The German painter Jacob Lehnen (3 feet, 10 inches), the actors Moreau, Fleury and Garry, and William Hay¹, at one period in the 18th century M.P. for Sussex, were dwarfs. Pope, 4 feet 6 inches, and deformed, has been described by some writers as almost a dwarf. Varro has written of two Roman gentlemen, to whom also Pliny refers, of stature equal to two Roman cubits (about 3 feet) who from their decorations must have belonged to an equestrian order (Gould and Pyle). One of the most celebrated dwarfs of more modern times was Jeffrey Hudson, who figures prominently in *Peveril of the Peak* of Sir Walter Scott. Born in 1619 at Oakham in Rutlandshire of quite normal parents he was presented by the Duchess of Buckingham, at the age of 9 years, to Henrietta Maria, the wife of King Charles I. His height was then scarcely 18 inches. At the age of 30 years he had attained a stature of 3 feet 9 inches. This dwarf was endowed with considerable ability and was sent to France to obtain a midwife for the first accouchement of the Queen. He served as a captain in the Royalist army during the Civil War, and accompanied the Queen to France on her banishment. Amongst other accounts of his actions is that of a quarrel with a gentleman named Crofts. To the resulting duel the latter came armed with a squirt; a second meeting having been arranged with pistols on horseback, Crofts was slain on the first discharge. Jeffrey Hudson in 1679 was sent to the gatehouse Westminster, charged with complicity in the popish plot. He died in receipt of a royal pension at the age of 63 years. His portrait² is at Hampton Court and at Buckingham Palace, and an engraving is in the Print Room of the British Museum. (Fuller details are to be found in the *Dictionary of National Biography*.) About the same time there lived (1615—1690) at the Court of King Charles I a dwarf named Richard Gibson, of very diminutive size, 3 feet 10 inches. He was a celebrated miniature painter and subsequently became the drawing-master of the Princesses Mary and Anne, daughters of James II. He married Anne Shephard, a dwarf of Queen Henrietta Maria. Gibson lived to the age of 75 years and his wife to 89 years. There were nine children, five of whom lived to maturity and were of normal growth, by this marriage. A head of Gibson drawn by himself is in the Print Room of the British Museum, and an engraving of miniatures of Gibson and his wife is in the edition of Walpole's *Anecdotes of Painting*, issued in London, 1849: see Bibl. No. 97.

Other well-known dwarfs were:—Wybrand Lolkes, son of fisher-folk at Jelst, Holland, a skilful jeweller. He amassed a large fortune by exhibiting himself in Holland and England, and died in 1800, aged 70 years. (He has been classed by Regnault as achondroplasic.) Nicholas Ferry, also known as Bébé, was born in the Plain of the Vosges in 1741. His height was 29 inches. He was presented at the age of 5 years to King Stanislas of Poland. He was mentally deficient. He died at the age of 22 years. His family and personal history and the photograph of his skeleton are given under Ateleiosis. (See Plate Z (39) and (40), and for further details Buffon and I. Geoffroy-Saint-Hilaire³.) Joseph Boruwlaski was a dwarf very well known in his time, of whom the Comte de Tressan and Caroline Hutton⁴ have

¹ See Bibl. No. 23^b. Hay was probably deformed, not a real dwarf. EDITOR.]

² A portrait of Jeffrey Hudson, dwarf of Henrietta Maria, painted by a Dutch artist has recently been added to the National Portrait Gallery: see our Plate HH (66).

³ Bibl. Nos. 88 and 75, T. 1, p. 140.

⁴ See Bibl. Nos. 28 and 88.

written accounts and whose autobiography exists¹. Born in Poland in 1739, he died in England aged 98 years. He was a good linguist and above the average in intelligence. His family and personal history are given under Ateleiosis. We reproduce Bonomi's excellent cast taken from this dwarf while alive: see Plate II (67) and (68). Mary Jones of Shropshire was of height 32 inches. She died in 1773, aged 100 years. Richebourg, a servant of the House of Orleans and afterwards one of its pensioners, was of height 23 inches. He died in 1858, aged 90 years. During the French Revolution he passed in and out of Paris disguised as an infant in its nurse's arms, and so was enabled to convey important information to his friends within and without the city (Garnier). Nannette Stocker who died at Birmingham in the 18th century, aged 39 years, was said to be "the smallest woman in the kingdom and one of the most accomplished." Born at Kammer in Northern Austria, her height was 33 inches, growth having ceased at the age of 4 years. "She was a good pianist and otherwise accomplished." See Plate II (69). Robert Skinner was of height 0.43 m. and his wife Judith about the same. They were exhibited in London in 1843 and made a small fortune. In twenty-three years there were fourteen robust and well-formed children of this marriage. (Gould and Pyle².) Another most remarkable example of dwarf growth was Carrie Akers. Her height was only 2 feet 10 inches, but she weighed, it is stated, 309 pounds (22 stone 1 pound)! Her portrait is shown in Gould and Pyle's book. She does not appear from this to belong to any of the commoner varieties, and appears to be almost unique³. "General Tom Thumb" (Charles Stratton, born 1832) was another well-known dwarf. He ceased to grow at the age of 5 months and his height was less than 21 inches. With him were associated, in his professional career, three other dwarf colleagues, "The Sisters Warren" and "Commodore Nutt." "General Tom Thumb" gave his hand in marriage to one of the sisters, and it is said that she bore a child of normal proportions, which, however, died in infancy. Other well-known dwarfs seen in exhibitions in modern times were "General and Mrs Mite," of the U.S.A., and "General and Mrs Small" (a dwarf named Morris of Blaenavon, North Wales, and his wife). Morris's height was 35 inches. His wife was still smaller. She was the mother of twins of normal growth in 1895. (Gould and Pyle.) The Russian dwarf, Dantlow, considerably antecedent in point of time to these, showed dwarf growth associated with congenital deformities⁴. This dwarf showed evidence of rickets in his limbs (all that he had) and vertebral column. He had only four toes on each foot, and the arms were almost entirely lacking. At the age of 30 years, however, he was "of a pleasant appearance" and "of a happy disposition." "He feeds himself with his left foot and writes a round hand, clearly legible, with the same member, both in Latin and in Russian." In the same journal another Russian dwarf is, it is reported, described by an anonymous author (account not found). He, it is stated, was elected by the Empress of Russia to the Academy of Arts. Other dwarfs (classed as achondroplastic by Regnault⁵, see Achondroplasia) were: Owen Farrel, "the Irish dwarf," of height

¹ See Bibl. No. 48.

² Cf., however, Iconography No. 68 and the dwarf "Barbino" in the section on Statuary. EDITOR.]

³ See Bibl. No. 84.

⁴ See Bibl. No. 332.

⁵ See Bibl. No. 411.

1·137 m. (4 feet 5·9 ins., Hunter had one of his femora which measured 9·5 ins.), very well known in his time, he died in 1742; he was noted for feats of strength and endurance much above the average; his portrait is in the Royal College of Surgeons and in the Print Room of the British Museum: see Plate KK (74). Wybrand Lolkes, already referred to, of height 0·648 m., who died in the year 1800, aged 70 years. Tom Pouce, who died in the year 1843. The dwarf of Broca¹ (1877). Balthazar Zimmermann of de Quatrefages² (1881), and the dwarf of Sabudini (1887)³.

There are many other accounts of dwarfs besides those referred to in the above short summary. But this seems enough to indicate that these individuals are sometimes capable of achievements above the average, though this is exceptional and is probably confined to three or four classes, the achondroplastic, the rickety dwarfs and a few examples of the class "ateleiosis," "true dwarf growth" ("echter Zwergwuchs," "nanisme vrai"). To these may perhaps be added the very undersized individuals, referred to under the heading of racial dwarfs, in which the query arises whether they have a racial or a pathological cause. Nearly all the other varieties are, from their nature, deficient: *e.g.* cretinism, etc.

There has recently, 1909 to 1910, been an exhibition of some fifty-three dwarfs⁴ of both sexes at Olympia, in London: see Plates Q, CC, DD, EE and FF. In addition to holding stalls, where commodities of various kinds were sold, there were a variety theatre and a circus in this exhibition. The performance was of much the usual type—in miniature. Some of the ponies in the circus seemed to show the same condition of ateleiosis (*i.e.* disease) as did the human dwarfs, while others were racial dwarfs (*e.g.* Shetland). Many varieties of acrobatic feats were to be seen, *e.g.* that of the lady who manœuvred the rolling ball upon an inclined plain, and of the gymnast who stood in an inverted position upon his hands on the upraised soles of the feet of a colleague; there were also the humorist, the vaulting equestrian athlete and the dwarf representative of Hercules. The last, aged 23 years, weighed 40 pounds. He supported by "the bridge" performance a weight of between 280 and 300 pounds (two men of above medium weight), a feat which in proportion to weight seems to compare not altogether unfavourably with that of many other "strong" men. He had the general appearance of a child of 10 years, and the musculature in its lineaments showed the form of that of childhood. Most of these performances, though remarkable, conveyed the impression of automatism, like the tricks of performing animals, and seemed to lack spontaneity and to need the presence of full-grown assistants for their performance. But this was not the case with some of the equestrian feats by one of the larger dwarfs; this dwarf was probably rickety.

In the Print Room of the British Museum there are prints ranging in date from about the year 1620 to 1860. These show many notable and notorious individuals of their day, such as noted pugilists and other athletes, giants, eccentric individuals and human curiosities, etc. Amongst these prints are those of the following dwarfs: (1) Jeffrey Hudson, already referred to, ateleiotic. (2) "The

¹ See Bibl. No. 169.

² See Bibl. No. 187 [probably myxoedematous. Edmon.]

³ See Bibl. No. 238.

⁴ At a banquet of Cardinal Vitelli in the 16th century, *thirty-four* dwarfs are said to have waited on the guests: Blaise de Vigenère, cited by Garnier, Bibl. No. 205, p. 106. Cf. also *fn.* 2 on p. 359 above.

wonderful and surprising English dwarf, 2 feet 8 inches high. Born at Salisbury, 1709. Has been shown to most of the Nobility and Gentry of Great Britain." This dwarf, a female, appears to be ateleiotic, but the print is somewhat crude and bears no name, and the features of the condition, whatever it may have been, are not well shown. (3) Owen Farrel, already referred to, achondroplasic. (4) "Mr Coan, the Norfolk Dwarf, 3 foot high. Died aged 36 years"; "with Mr Bamfield, the Staffordshire giant, 7 foot 4 inches high." Date 1771. This dwarf appears to have been ateleiotic. (5) "John Tarr, aged 57 years. Height 4 foot 3 inches. Born in the village of Bampton. For fifteen years ostler at the White Horse. For twelve years, boots at the Three Pans, Tiverton." Period 1787 to 1830. He appears to have been achondroplasic. (6) Andrew Whitson—a crippled dwarf concerning whom no details are given, but he looks like a case of birth palsy and was probably mentally deficient. (7) A Show Bill representing "Richard Garnsey, 'The Miniature John Bull'—Born at Kittsford near Taunton in 1831. Height at the age of 16 years was 34 inches. Has not grown since he was four years old. 'The miniature John Bull' is pronounced by Sir James Clark, M.D., Dr Locock, Dr Fergusson and Dr Dalrymple to be the most symmetrical dwarf in the world." "Exhibited before the Society of British Artists." This appears to have been a case of ateleiosis. (8) An individual named George Trout, "one of the Porters to the Honourable the House of Commons," no date given, but about 1840—60, was probably achondroplasic. In a print recently on view in London, a Persian dwarf of the 18th century was shown, who was stated to have possessed great strength, lifting large stones with his hair, and who spoke seventeen languages¹.

There was at the Savoy Hotel, London, December, 1910, a Hungarian dwarf named Mademoiselle Anita. She was said to be aged 25 and 25 inches tall. She spoke English, French, German and Hungarian, and was said to be perfectly formed. According to the daily papers she was engaged to be married and had come to London for the purpose of buying her trousseau and arranging an insurance for £50,000 on her life. She has since been on exhibition in the provinces. She is probably ateleiotic. We give a portrait of her on Plate HH (65).

II. CLASSIFICATION OF VARIETIES OF DWARF GROWTH².

The term "dwarf" is a general one applied to all individuals who are markedly smaller than the average. The influences which may produce this effect, as well as the anatomical conditions that occur, are many. Methods of examination were for long confined to measurement. More recently, however, cases have been investigated anatomically, and it has been shown that many different abnormal processes may cause the defect. Investigations by radiography, by which means alone diagnosis of some of these bone conditions in adult life has been rendered possible, have enabled notable advances to be made. The relationships of the different varieties of dwarf

¹ This is probably the dwarf exhibited in 1740: see *Daily Advertiser*, Aug. 18, 1740, and Bibl. No. 138, p. 310.

² [For this discussion (pp. 363—370) the writer, with Professor Sternberg's consent, is indebted, materially and literally, to *Nothnagels Specielle Pathologie und Therapie*, Wien, 1899, Band VII. 2 Hälfte: see Bibl. No. 364. Editor.]

growth to one another have now been shown, chiefly by the researches of Virchow, Kundrat, Paltauf, Kaufmann, Porak, and others. The condition in dead born infants, formerly known as "foetal rickets," "micromelia," etc., and the relation of defective growth to disturbances in function of the thyroid gland, have now in part been explained. The relation of the condition known as "infantilism" to dwarf growth has also been determined.

Following the classification of Kundrat¹, growth depends upon the following factors:—(1) Inherited disposition or tendency; (2) Nutrition; (3) Conditions of life—surroundings or environment; (4) Habits of life. Pathological influences may affect:—(1) The inherited disposition; (2) Intra-uterine development; or (3) Growth in infancy and childhood. In cases of dwarf growth it is not yet possible in all cases to locate exactly cause and effect, but a general view of the condition as a whole has been attained, so that from many varieties several natural groups can be formed.

A. GENERAL CLASSIFICATION OF VARIETIES.

Group I. Cases which may possibly be caused by either (1) changes of conditions (environment) within physiological limits², or, as seems more probable, by (2) inherited tendency alone; but, at least in some instances, possibly by both causes working together. Under (1) would be such factors as: (a) deficient or unsuitable food, especially insufficiency of albuminous content; (b) cold; (c) excessive and long-continued over-exertion, beginning in early childhood and continued throughout life. To this Group I would belong the real dwarf races referred to, "Akkas" or other negrilla races (the Bushman of South Africa, *e.g.*), and relatively small peoples such as Andamanese, Eskimos, Laplanders, Gurkhas, Japanese, etc., and the individuals of exceedingly stunted growth seen in European cities, the victims of want and misery (whether as cause of dwarf growth or effect of it).

Group II. Cases in which, it is supposed, the protoplasm has a special tendency to defective development. This condition affects individuals, or it may be stocks, but not the race. To this group belong cases of general hypoplasia, found in one or more individuals of a family, side by side with well-grown brothers and sisters, in twin children, or in cases of multiple births, and the defective growth that sometimes occurs in hereditary syphilis and is said to occur in the children of drunkards, or of those affected by plumbism, other metallic poisons or intoxicants, and here belong, *perhaps*, cases of ateleiosis or true dwarf growth.

Group III. In this group, which to a large extent merges with the last, the influence adverse to growth is brought to bear during intra-uterine life. Examples: the dwarf growth of microcephaly, porencephaly, etc., and the defective growth sometimes seen in children born before full term. In all these cases, dwarf growth is by no means invariable; and they merge largely with those of Group II.

¹ See Bibl. No. 267.

² This factor seems to be an improbable one. It is common to find a dwarf race and another race side by side under much the same conditions, *e.g.* "Bushman" and "Kaffir," "Akka" and "Masai." Again, amongst the Japanese, if accounts may be trusted, it is, on the whole, amongst the highest classes of the race that the smallest stature is observed; but the environment of these must be supposed to be the most advantageous. It seems more reasonable to suppose that heredity alone is the cause of the particular average stature in these cases.

Group IV. Cases in which the adverse influence has been exerted during childhood. Here development at first apparently normal has, after an illness, ceased to advance at the usual rate. This has been observed in acquired hydrocephalus, chronic meningitis, pneumonitis, malaria cachexia, granular kidney of childhood, congenital heart disease, acquired heart disease with valvular failure early in life, in other disorders of the circulatory system, and the chronic alcoholism of childhood, and disorders of suprarenal body, pancreas and intestines. Trauma has been regarded as an occasional cause, and Rohrer's case¹ is quoted as an example, but the case was very insufficiently described and the recorded syphilis of the father must be taken into consideration (Sternberg).

Group V. This group is formed by cases in which, owing to absence, disease or operative removal of the thyroid gland, development has ceased. (True cretinism and infantile myxoedema and surgical cachexia strumipriva occurring in childhood.) "Besides cases such as these there seems to be other evidence of the influence that the thyroid gland exerts upon development, gained from clinical experience of the effects of thyroid extract upon dwarf growth in cases other than the last" (Sternberg).

Group VI. In this group are placed general disturbances of growth which show some affinities with the conditions of the last group, and have sometimes been grouped with them. Such are: rickets, the so-called "real dwarf growth" or "ateleiosis" ("echter Zwergwuchs" or "nanisme vrai")—in which epiphyses and diaphyses remain ununited throughout life, as in the thyroid gland group; and the dwarf growth of defective development and premature junction of epiphyses to diaphyses—"achondroplasia" (Parrot²) or "chondrodystrophia, dystrophia hypoplastica or foetalis" (Kaufmann³). "The conditions included under this head are really heterologous, but cannot at present be further classified aetiologically and even from those of the thyroid gland group they cannot, aetiologically, be definitely marked off at present" (Sternberg). Compare Plates Y, JJ (71), LL—PP.

B. PATHOLOGICAL ANATOMY OF VARIETIES OF DWARF GROWTH COMPARED.

Kundrat, who was the first to deal with this aspect of dwarf growth comprehensively, differentiated two varieties of changes: (1) Quantitative. Here the processes of ossification are normal, as far as they go, but are retarded. (2) Qualitative. Here these processes are altered by disease. To this group belong Groups V and VI of the last heading. Though this is a useful general classification it must be largely modified when applied to individual cases, and not only the changes that take place in the skeleton but the time at which these occur must be considered.

Varieties of Dwarf Growth.

I. Dwarf growth, the result of insufficient development and premature ossification and union of epiphyses with diaphyses ("Chondro-dystrophia hypoplastica," Kaufmann; "Achondroplasia," Parrot). The individuals of this class have short

¹ See Bibl. No. 222.

² See Bibl. Nos. 161 and 172.

³ See Bibl. 279.

arms and legs, relatively to the size of the trunk, which is of approximately normal growth. This shortness of extremities is indicated by the term "micromelia" ("little limbs"). This term, however, expresses nothing of the underlying cause, and "micromelia" may arise in more than one way, either as a result of diminished growth or of other disturbances in the region of growth of bones. See Plates U and Y illustrative of rickets and achondroplasia and the fuller treatment below under Achondroplasia.

II. *True Dwarf Growth.* (Kundrat and Paltauf¹.) Ateleiosis (Hastings Gilford²). These dwarfs are to be recognised by the fact that the cartilage discs persist throughout life. This can be shown by X-ray examination during life or in the skeleton after death. The epiphyses of the bones of the extremities, if present, do not join the diaphyses, but are separated from them, as in infancy, by cartilage, or are, at most, united to them by thin bridges of bony tissue. In many bones the epiphyses do not appear at all, being represented by cartilage, as in the infant. The skeleton in general is weak, but it shows no such disproportion in length between the trunk and extremities as occurs in the first group. Individual centres of ossification, as those on the spinous and transverse processes of the vertebrae, or the trochlear nucleus of the humerus, which normally appear late may be entirely lacking. The vertebral bodies are depressed. The sternum remains throughout life as several pieces of bony tissue united by cartilage. In the pelvis the tri-radiate cartilage of conjugation persists throughout life. The face is often "cretin-like," or for this appearance Sternberg suggests as a better term "infantile." This peculiarity is caused by the broad saddle-shaped depression of the bridge of the nose associated with a skull of brachycephalic form. The form of the nose depends upon defective development of the bones of the base of the skull. The defect is not one of premature union by bone, as in achondroplasia, but is produced, as in cretinism, by lack of growth of bone, the cartilage of conjugation persisting throughout life. Dentition is delayed and the milk teeth are not unusually retained until late in life. The genital organs are little developed, they are often in an infantile condition. For the most part the secondary sex characteristics, such as hair about the face, pubes and axillae, are also wanting. In the female the pelvis and mammary glands are incompletely developed. Such individuals are usually sterile. The face retains through life an infantile or "puerile" appearance. This "puerile" condition, which may affect females as well as males, sometimes produces in the former a somewhat masculine appearance. The genital organs may remain in the early foetal condition. Schaaffhausen found bilateral cryptorchism in his first case. Incomplete descent of the testes is usual and is usually bilateral. The intelligence is slightly defective as a rule. This is shown by a childish, shy or timid disposition and lack of self-reliance. The visual organs are almost uniformly normal in this class of dwarfs.

III. *Dwarf Growth associated with Lesions of the Thyroid Gland.* These conditions need only be outlined here for comparison with and distinction from other groups. Typical cases of the last group (the "real dwarfs") are easily recognisable. In certain cases, however, it is difficult to draw a sharp line between them and cases

¹ See Bibl. No. 262.

² See Bibl. 408.

of disturbed bone growth of the present group due to thyroid gland lesions. (a) On the one hand the skeleton in the latter cases presents just the same diminution of its development as in the real dwarfs, and the cartilage of conjugation persists, the epiphyses remaining ununited to the diaphyses throughout life. (This occurs in operative removal of the gland before growth is complete, in infantile myxoedema and in real cretinism.) According to Sternberg, Paltauf has erroneously included several of these cases amongst the "true dwarfs" described by him, but at the time at which he wrote the functions of the thyroid gland and its influence upon growth were not understood as they have since become. (b) On the other hand the "true" dwarfs (ateleiosis) present a number of features by which they seem to be allied to myxoedema. Such are the peculiar conformation of the skull, which is the same as is seen in cretins, and the "cretinoid" facial appearance. Defective development of the genital organs and the "puerile habitus" are other features common to both, and in the "true dwarfs" the defect of intelligence occasionally goes as far as idiocy. In some of them the thyroid gland seems to be abnormal. The two groups, infantile myxoedema or cretinism, and "real dwarfism" ("echter Zwergwuchs"; "nanisme vrai") or ateleiosis, seem to merge into one another, and it is not impossible that they have relations in common, though what these are does not definitely appear, in the present state of knowledge. "Brissaud¹ has classified in one group that of myxoedema, the 'true dwarfs,' and 'infantilism.' He considers all to be cases of myxoedema in which the symptoms usually associated with it are little marked, and terms the condition 'myxoedeme fruste.' In the present state of knowledge this view cannot be refuted and must stand until more is known of these conditions*."

IV. *Rachitic Dwarfs.* Rickets is the commonest cause of dwarf growth (Sternberg), and many exhibition dwarfs have been rickety. These individuals often show deformities, and in many cases the diagnosis can be made at a glance; in other cases a thorough examination is necessary to establish it. Upon the subject of X-ray investigations opinions differ. Sternberg considers radiography to be of little value in distinguishing rickets from other conditions. Other authorities, notably Porak², hold an opposite view.

As this paper is only concerned with the varieties of pathological dwarf growth, which at the present time show undoubted evidence of heredity in causation, rickety and cretinoid dwarf growths are only referred to in order to show their relationships to these other varieties. See Plates GG and NN.

Dentition. The germination and eruption of the teeth are liable to be disturbed in all varieties of dwarf growth except that of achondroplasia. Persistence of the milk dentition and delayed eruption of the last molar are common in the "true dwarfism" of Kundrat and Paltauf (ateleiosis of Hastings Gilford), and in cretinism, microcephaly, etc.

Age of Onset. The age at which "dwarf growth" begins, or at which growth becomes retarded, varies in the different conditions and in different cases of these. Certain dwarfs, such as the achondroplastic variety, enter the world as such (though

¹ See Bibl. No. 384.

² See Sternberg, Bibl. No. 364.

³ See Bibl. 491.

some observers state that the condition may be acquired after birth). The diagnosis can with those exceptions be made at birth. The study of achondroplasia was begun in new-born infants, mostly still-born, whose peculiar shape had attracted attention; and a good deal of the knowledge of the anatomy of the condition was gained from these before the identity of the condition with that of the short-limbed dwarf adults, familiar from remote times, was realised. In other cases only the history can determine this point; growth in normal children is not continuous in the various segments, first one part then another is advanced¹. It may be impossible to determine the time of onset exactly. In some cases of "true dwarf growth" it is clear that the influence, whatever this may be, was brought to bear *in utero*. [Such a case is that of Caroline Crachami, "the Sicilian dwarf," whose skeleton is in the Museum of the Royal College of Surgeons (Sir Everard Home² and Hastings Gilford³). Bébé (Buffon and Geoffroy-Saint-Hilaire⁴) may perhaps be another.] In other cases the history given is that these individuals were of about ordinary size at birth, but ceased to develop at the ordinary rate in the early months or years of life. In other cases cessation of growth occurred in relatively later years, up to the time of puberty. For these facts numerous old but well authenticated accounts speak (for instance those by I. Geoffroy-Saint-Hilaire) and many modern ones (accounts by Hastings Gilford, Sternberg and others). The same observers, as well as Schaaffhausen, Paltauf and others, have shown that in a number of cases growth is merely retarded to a minimum, but very slowly continues until quite late in life (up to the 30th year or later). In other cases growth, having apparently ceased for years, may recur and slowly continue until still later in life; or in such a case there may be in about the same short period of time a relatively large increase in growth. This peculiarity of course only affects the varieties of dwarf growth in which the epiphyses remain ununited to the diaphyses through life.

Duration of Life. This is relatively short; comparatively few reach old age. A reference to the account of individual dwarfs given in the introduction will, however, show that such ages as 100 years, 90 years, 80 years and 75 years have been attained, and many have reached the sixth decade.

The Prognosis of Disease, with the exception of achondroplastic and rickety dwarfs, is to be made guardedly, relatively to that for other individuals; "dwarfs present, for the most part, pathological bodily conditions and have slight powers of resistance" (Sternberg).

*Infantilism*⁵.

Since many varieties of dwarf growth show the condition known as "infantilism" or "the puerile habitus," the condition seems to require definition. This occurs, either occasionally or constantly, in all varieties of dwarf growth except achondroplasia⁶, but its occurrence is not confined to dwarf growth, and, as stated, it

¹ Humphry: *On the Skeleton*, Cambridge, 1858, pp. 97 *et seq.*

² See Bibl. No. 58, Vol. v. p. 191, Ed. 1828.

³ See Bibl. No. 403, p. 305.

⁴ See Bibl. Nos. 88 and 75.

⁵ The mode of classification here followed is that of Sternberg (*loc. supra cit.*) and of Thomson (*Allbutt's System of Medicine*, 2nd edition, Vol. iv. Part 1. p. 486). [An interesting account of the views on Infantilism of Lasègue, Lorain, Ausset, Breton and Hutinel will be found in *Archives de Médecine des Enfants*, T. v. pp. 488—90, Paris, 1902; but see especially Ettore Levi's important memoir of 1908, Bibl. No. 588 (with bibliography). *Editor*]

⁶ Achondroplasia, like other morbid conditions, may be associated, in the same individual, with others, *e.g.* mental deficiency (as in a family shown in the pedigrees), and with some of these "infantilism" may be associated.

does not occur in all varieties or cases of that condition. The explanation of "infantilism" seems to be as follows: When an individual has ceased to be a child and has become an adult this fact is shown, not by increase of stature and power, but by maturity of the genital organs, *i.e.* by acquisition of "the primary sexual characteristics" of adult life. With these "the secondary sexual characteristics," bodily and mental, are acquired; the outlines of the figure become more marked and definite, it becomes that of a man or of a woman rather than of a child; in the male the larynx enlarges and the voice changes; in the female the breasts enlarge; hair appears on the pubes and axillae and in the male also upon the face; the epiphyses of long bones join the shafts and growth of these in length practically stops; the mental outlook changes. By the term "infantilism," devised by Lasègue, is implied the maintenance of the genital organs in the infantile state of development with a lack of secondary sex characteristics, *i.e.* there is failure of the primary and secondary sex characteristics to appear at the proper time; and this may occur in individuals of dwarf growth, in those of ordinary growth, or in giants. Any of these may show "infantilism." This term denotes, therefore, merely a group of symptoms and no more. In many cases individuals thus affected, of male sex, show some resemblances to women, and females of this kind somewhat resemble males; hence the synonymous terms "Masculism" or "Androgynism" and "Feminism" have arisen (Meige: Bibl. No. 306). "Infantilism" may be associated with disturbances of growth of various kinds and seems to have a cause in common with them. It occurs in the following conditions: (I) In the dwarfing of growth which results from intoxications such as (1) chronic tuberculosis, *e.g.* hydrocephalus and spinal caries; (2) congenital syphilis (Fournier²); (3) malaria cachexia (Borelli³); (4) leprosy, pellagra and some of the commoner infective diseases (Lancereaux); (5) in very severe rickets (Sternberg); (6) chronic alcoholism of childhood (Sternberg); (7) prolonged and excessive doses of such materials as mercury, lead, morphine, tobacco and bisulphide of carbon (Thomson). (II) In the abnormalities of growth which seem to depend upon gross lesions or defects of important internal organs such as: (1) thyroid gland; examples, cretinism and infantile myxoedema; (2) pancreas (Bramwell⁴, etc.); (3) liver, hypertrophic biliary cirrhosis (Lereboullet⁵); (4) suprarenal body (Morlat⁶); (5) kidney, *e.g.* congenital granular kidney (Stephen Mackenzie, Schorstein, and others); (6) pituitary body, as in gigantism and acromegaly and other apparently allied conditions (Sternberg, Ferrier). (III) In disturbances of growth associated with deficiencies of the circulatory system, either congenital or beginning very early in life, such as congenital stenosis of the aorta and stenosis of the mitral and aortic valves of the heart, and general defects of the circulatory system. (IV) In

¹ As an example of dwarf growth produced by the influence of the tuberculous toxin, the small stature sometimes seen in cases of tuberculous disease of the spine (Pott's Disease) is quoted. Individuals thus affected show in their proportions the converse of achondroplasia. That is, they have long limbs and a short trunk and a head of ordinary size. Such individuals form broadly two groups of cases: (1) Those in which, in adult age, the limbs are of the average length and the head is of average size; they owe their defective stature to the shortness of trunk produced by their spinal disease and resultant deformity. Such cases are those, for the most part, in which the onset of disease occurred relatively late in childhood. They are not, properly speaking, dwarfs at all, though they may show a stature sufficiently small to be classed as such. (2) Those in which, as well as the spinal deformity and shortening of trunk relatively to length of limbs, the growth of all parts is retarded to a minimum by the influence of the tuberculous toxin during the period of growth. Such cases are, for the most part, those in whom the onset of disease occurs in relatively early life. Though they present the same relative proportions as (1), they are dwarfs strictly speaking, and it is in them more particularly that "infantilism" occurs.

² See Bibl. No. 228.

³ See Bibl. No. 481.

⁴ See Bibl. No. 190.

⁵ See Bibl. No. 460.

⁶ See Bibl. Nos. 458 and 481.

conditions such as congenital adiposis, progressive muscular dystrophies (Sternberg), in the dwarfing of growth that occurs with microcephaly, spastic diplegia and in some cases of the dwarf growth of obscure origin called "ateleiosis," or "true dwarf growth" already referred to and, occasionally, in individuals of ordinary height who present no other peculiarity.

"Infantilism" is not invariably present in the above conditions. For instance, of two ateleiotic dwarfs, brothers, of the same height, who show otherwise the same features exactly, one shows "infantilism" and the other does not. With "infantilism" there is usually associated defective function of the sexual glands, but this does not appear to be either invariable or, when present, always complete. Apart from such conditions as cretinism (amenable to treatment and in which treatment seems to improve all symptoms, including "infantilism," equally) there are grounds for supposing that occasionally as age advances "infantilism" becomes less marked or tends to pass away.

III. ACHONDROPLASIA¹.

A. INTRODUCTION.

In some instances achondroplasia shows the influence of heredity in its causations. It is with this aspect of the subject that this paper is concerned; but in order that the mode of working of its heredity be understood, a short description of achondroplasia seems desirable. Numerous achondroplastic dwarfs have already been referred to. That achondroplasia is not a "new disease" has been proved by Parrot², Pierre Marie³, Porak and Durante⁴, and Regnault⁵, who have shown that it has been represented in the statuary and pictures of ancient artists. The figures shown in the illustrations on Plate S (14) of the Egyptian gods⁶ Ptah-Sokar and Bes and the caricature statuette of Caracalla, as well as existing representations of the gladiator dwarfs of Domitian, show this⁷. In the ancient Greek picture, reproduced by Garnier in his book⁸, the dwarfs are obviously achondroplastic. According to Porak and Durante (*loc. supra cit.*) many of the clowns of courts, of grotesque figure but of marked intelligence, have probably been of the same nature. Regnault believes that Owen Farrel (see Plate KK (74)), Wybrand Lolkes, Tom Pouce, Broca's dwarf and Sabudini's dwarf were achondroplastic. Reference has already been made to portraits of achondroplastic dwarfs by great masters. It seems on the whole probable that famous men of action, who were of dwarf stature, were either rickety or achondroplastic; for instance, Attila, King of the Huns, Prince Eugen, Wladislaus Cubitalis of Poland and the Spanish Admiral Gravina. But details of their proportions are not precise, and therefore their nature can only be surmised. At the present day achondroplastic dwarfs are not infrequently seen playing clowns' parts at fairs and circuses; e.g. two

¹ [Pp. 370—384 are largely translation and adaptation of the classical memoir (see Bibl. No. 491) of Porak and Durante, whose consent to this use of their work has been most generously given. EDITOR.]

² See Bibl. No. 172.

³ See Bibl. No. 371.

⁴ See Bibl. No. 491.

⁵ See Bibl. No. 411.

⁶ The humerus of an achondroplastic dwarf was found in the tomb of King Zer (1st Dynasty), also a stele near the tomb with a very achondroplastic looking figure. See Petrie: *Royal Tombs of Earliest Dynasties*, 1901, Part II., Plates VI. A. 14 and XXVIII. 58. Two steles of dwarfs, with skeleton of one and bones of another dwarf, were obtained by Petrie from the tomb of Mersekha-Semempes, 1st Dynasty; see *Royal Tombs of the First Dynasty*, 1900, Part I. pp. 13, 27 and Plate XXXV.

⁷ See Note A, p. 386, on early achondroplastic figures.

⁸ See Bibl. No. 205, p. 8.

of Apert's cases¹ were circus clowns or "eccentric comic artists" as they describe themselves. One of the individuals, whose pedigree is described below, was a music-hall artist of the humorous type. Photographs are also shown (Plate R (11)—(13)) of a Chinaman, a native of Hankow, 500 miles up the river Yang-tse-kiang, of achondroplastic proportions, who was discovered at Shanghai by Dr Gordon Moir, Surgeon of the Royal Navy², earning a livelihood by dancing and buffoonery. Another Chinese case, that of Li, is published by Molodenkoff³; he is a nomadic conjuror and juggler.

The congenital bony "dystrophies," supposed to arise more or less early in the development of the embryo, were for long all confused under the name "rickets." Gradually, however, within recent years, the differences of some of these conditions from rickets and from one another have been made out. Some of them show, amongst other characters, shortness of limbs (micromelia). The term micromelia, however, expresses nothing of the pathology, and micromelia occurs in several conditions, which differ from one another clinically as well as in their pathological anatomy. Amongst these are true achondroplasia and "the periosteal dystrophy" (Porak and Durante⁴), the latter was formerly included with the former under the name achondroplasia. Some of the congenital bony dystrophies (cleido-cranial dysostosis, congenital rickets and congenital syphilis) and various kinds of dwarf growth need no further discussion here; others, such as congenital osteoporosis or congenital fragilitas ossium, and congenital malformations (discussed elsewhere in *The Treasury*), belong to a different group, and need also only be mentioned here. Chaussier⁵ (1819), Romberg⁶ (1817), M. J. Weber⁷ (1829), Busch⁸ (1836), and Dumenil⁹ (1857) described foetuses with short but thick limbs, which they distinguished from rickets, but did not know how to name. Depaul¹⁰ (1851 and 1878) did the like, and took the possibility of hereditary syphilis into consideration. Virchow¹¹ (1856) described a foetus with short limbs and large head as a case of congenital rickets. H. Müller¹² (1860) distinguished a case of this kind from the rickets of infancy. He believed it to be an example of rickets arising *in utero*, and described the characteristics of the condition as "default of ordination of cartilage cells, with premature synostosis of the bones of the base of the skull." Winkler¹³ (1871) proposed for this condition the name "Rachitis micromelica"; Urtel¹⁴ (1873) advanced the hypothesis that the condition was one of intra-uterine inflammation of cartilage (chondritis foetalis). But other authors such as Scharlau¹⁵ (1867) and Fischer¹⁶ (1875) regarded it as true rickets, either simple or complicated by cretinism. In 1876, however, Parrot¹⁷ drew attention to the differences between this condition and true rickets on the one hand, and hereditary syphilis on the other, outlining its clinical and pathological features as they are now known. These he stated to be (1) micromelia, or shortening of the long bones of the limbs, plus (2) abnormal shape of the cranium, (3) absence of thoracic deformity, (4) marked thickening of the skin. But his researches passed unnoticed, and the condition was still looked upon as a rickety or syphilitic

¹ See Bibl. No. 386.

² See Bibl. No. 68.

³ See Bibl. No. 111.

⁴ See Bibl. No. 143.

⁵ See Bibl. No. 161.

⁶ See Bibl. No. 547.

⁷ See Bibl. No. 61.

⁸ See Bibl. Nos. 100 and 165.

⁹ See Bibl. No. 144.

¹⁰ See Bibl. No. 550, p. 43.

¹¹ See Bibl. No. 78.

¹² See Bibl. No. 107.

¹³ See Bibl. No. 135.

¹⁴ See Bibl. No. 491.

¹⁵ See Bibl. No. 78.

¹⁶ See Bibl. No. 120.

¹⁷ See Bibl. No. 153.

manifestation, Eberth¹ (1878), M. A. Smith² (1880), Neumann³ (1881), Spiegelberg⁴ (1882), Kassowitz⁵ (1879) and several other observers continuing to hold the old opinion that it was an expression of true rickets. In 1889, Porak⁶ recorded some new facts, and entirely confirmed Parrot's views. He also described a hereditary case, demonstrated the occurrence of the condition in lower animals, and showed that the disease had really been familiar from very remote times. (See our illustrations, Plates S and LL.) In the same year Kirchberg and Marchand⁷ and Stilling⁸, in independent researches, came to conclusions much the same as Porak's. They concluded that it was of a different nature from rickets, but each gave the condition a different name. These papers, however, are only of historical interest. After this, confirmatory observations rapidly accumulated. Amongst these were those of Kaufmann⁹ (1893), who described 14 cases, S. Müller¹⁰ (1893), Lugeol¹¹ (1892), Salvetti¹² (1894), Thompson¹³ (1893), Porak and Durante¹⁴ (1894) and others. Although several cases in adults had been described, until the year 1900 for the most part only the achondroplastic foetus had been studied. But in 1900, P. Marie¹⁵ clearly described the condition in the adult for the first time. In 1901 and 1902, Apert¹⁶, and in 1902 Méry and Labbé¹⁷, also dealt with the condition in adults. They showed the distinguishing features between achondroplasia in adults and cretinism and myxoedema, which had hitherto been to a great extent confused. Apert and others insisted on the existence of hereditary myxoedema, and the importance of modification of species. Regnault¹⁸ (1901) examined 14 achondroplastic skeletons in the Dupuytren Museum with the object of determining the macroscopic morbid anatomy of the condition. Its radiographic characters were established by Johannessen¹⁹ (1898), Joachimsthal²⁰ (1899), Cestan and Infroit²¹ (1901), and Molin²² (1901). In 1902, Durante²³ showed that two conditions had hitherto been included under the term achondroplasia, namely (1) true achondroplasia, characterised by sclerosis of the epiphysial cartilages in early life, and (2) "the periosteal dystrophy," in which there is abnormality of the osteoblasts, while the epiphysial cartilage is normal. More recently, the researches of Porak and Durante²⁴ and many others have been published, but they are too numerous to be all given here. Achondroplasia is now recognised as a clinical entity. But its pathogenesis and the mode in which the bony lesion is produced are still uncertain. The variety of the conditions that occur in it explains this. These have been described as: Rachitis annularis or micromelica, Chondritis foetalis, Osteogenesis imperfecta, Pseudo-chondritis, Cretinoid Dysplasia, Micromelia chondromalacica or pseudo-rhachitica, Osteoporosis and osteosclerosis congenita, Periosteal Aplasia with osteopsathysosis, Chondrodystrophia foetalis, divided into three varieties, hyperplastica, hypoplastica and malacica by Kaufmann²⁵ (because of the large volume and dense consistency of the epiphyses), Micromelia, etc.

¹ See Bibl. No. 178.² See Bibl. No. 180.³ See Bibl. No. 191.⁴ See Bibl. No. 194.⁵ See Bibl. No. 217.⁶ See Bibl. No. 247.⁷ See Bibl. No. 243.⁸ See Bibl. No. 245.⁹ See Bibl. No. 279.¹⁰ See Bibl. No. 282.¹¹ See Bibl. No. 276.¹² See Bibl. No. 298.¹³ See Bibl. No. 281.¹⁴ See Bibl. No. 299.¹⁵ See Bibl. No. 371.¹⁶ See Bibl. Nos. 380 and 413.¹⁷ See Bibl. No. 410.¹⁸ See Bibl. No. 389.¹⁹ See Bibl. No. 351.²⁰ See Bibl. No. 363.²¹ See Bibl. No. 388.²² See Bibl. No. 387.²³ See Bibl. No. 412.²⁴ See Bibl. Nos. 490, 491.²⁵ See Bibl. No. 279.

In Germany the name "foetal rickets" is generally used for it, but leads to confusion. In France "achondroplasia" has been generally adopted, and this term is the one commonly used in this country. But the term "achondroplasia" has hitherto been used to describe what appear to be two different conditions as shown by Durante (*loc. supra cit.*). In one there is abnormal division of cartilage cells, with normal periosteal bone formation. In the other there is a defect of periosteal cell division with normal chondral cell division. Kaufmann, Porak and Durante (*loc. supra cit.*) and others have shown that the latter condition is a lesion of compact bone, and that there are two varieties of this congenital bony dystrophy, both of which were hitherto known as "achondroplasia": (1) true achondroplasia and (2) the periosteal dystrophy (*dysplasie periostale*).

(1) *True Achondroplasia* is a developmental disease of the skeleton appearing in the course of intra-uterine life, affecting chiefly the long bones of the limbs, the pelvis and the base of the skull. Histologically it is characterised by sclerosis of the cartilages of conjugation of the epiphyses. Clinically, its manifestations are: marked shortening of the limbs, which are very thick and heavy, deformity of the pelvis, and depression and broadening of the bridge of the nose, dependent upon premature synostosis of the cartilage-bones of the base of the skull, a fully developed cranial vault, a trunk of almost normal growth, intelligence equal to the average, and genital organs normally developed.

(2) *Periosteal Dysplasia* is a defect of development of the skeleton affecting especially the diaphyses of the long bones of the limbs, the ribs and the bones of the cranial vault. Histologically there is defect in the formation of periosteal compact bone. This is also shown by fragility, multiple fractures being of frequent occurrence. "There is no premature synostosis of the bones of the base of the skull, but the presence of shortened, curved limbs is usual, if not constant" (Porak and Durante¹). This variety of congenital bony dystrophy seems clearly to be rarer than achondroplasia. Its essential pathological features are normal chondral ossification and defective periosteal ossification. Micromelia is the only feature that it has in common with achondroplasia. As this account is concerned with achondroplasia, the condition does not require further reference here.

B. CLINICAL SYMPTOMS.

(1) *In the Newborn.* The diagnosis of the achondroplastic foetus can be made, in a typical case, at a glance. The infant is one with a trunk of normal size, short, very thick limbs, markedly curved with convexity outwards, head apparently rather bigger than usual, with bulging frontal and parietal eminences, and nose the bridge of which is depressed. The shortening of limbs, which are very thick, so that the girth of the segments is often equal to or greater than their length, usually affects all four equally. The finger-tips, which in normal individuals reach to the middle

¹ See Bibl. No. 490.

third of the thigh, reach, in these cases, no further than the great trochanter of the femur, or, it may be, the iliac crest. The shortening of bones which produces this peculiarity is more marked in the proximal than in the distal segment. It is more marked in the thigh and arm than in the leg and forearm, and it affects the foot and hand still less than the last two. In other words, while in normal newborn infants the thigh and arm are longer than the leg and forearm, in achondroplastic infants the reverse is true. But this condition is not quite constant in achondroplasia. The growth of bone in length and the general development from embryonic life to adult age do not occur in the normal in regular progression, but first one segment or part and then another is in advance, as was first shown by Humphry¹. Again the two ends of the diaphysis do not take equal shares in producing the increase in length of a long bone, the one growing much more extensively than the other. Therefore the above peculiarity may be more marked at one age than another and is said to be more usual in the adult than in the infant (Porak and Durante²). The *skin* is usually thickened, the subcutaneous tissues increased, from which transverse folds in the skin in the neighbourhood of the articulations result. As a consequence of this there is produced in the continuity of segments of the limbs, e.g. thigh, leg, and foot, or arm, forearm and hand, an appearance of several short cylinders, superimposed upon one another. The limbs have a peculiar pudding-like appearance (*aspect boudiné*) as a result. (See illustrations, Plate S (14).) Besides shortening there are other more or less obvious *deformities* of the limbs. The thigh is shortened with a concavity on its postero-internal surface (the foot is as a rule extended and rotated inwards). These deformities are not usually of high degree, but they form angles rather than general curves, and affect the points of union of epiphyses and diaphyses rather than the shafts of the long bones. The muscles seem to be more developed than in normal infants.

The hands and feet are broad and thick, like the other segments of the limbs, but present peculiarities of their own. The middle digit of the hands is short. Its length does not exceed that of its fellows on either side. The digits are roughly conical in form and diverge from one another at their extremities. They form the "hand like a trident" ("main en trident") as it was described by Pierre Marie³. Others have described the fingers as radiating like the spokes of a wheel. The face is relatively small, the root of the nose flattened and the frontal eminences prominent. The cranium is large and brachycephalic. The fontanelles and sutures are regular, or a little exaggerated, and the consistency of the bone of the vault is normal. While the cranium is large, the face is relatively small, and thus the head as a whole has a roughly pyriform shape as described by Porak and Durante⁴. The trunk is well formed and of normal size for the term at which delivery occurs;

¹ Humphry (Sir G. M.): *On the Skeleton*, Cambridge, 1858, pp. 97—98.

² See Bibl. No. 491.

³ See Bibl. No. 371.

⁴ This appearance is also the rule in hydrocephalus. In that condition, however, it is generally much more obvious than in achondroplasia. It is probably owing to this appearance that some cases of achondroplasia have been described as hydrocephalic as was the case in the foetal skeleton in Royal College of Surgeons reproduced on Plate W. Cestan (*loc. supra cit.*) has shown that the peculiarity is due to the conformation of bones. Nevertheless cases of achondroplasia in the foetus, the child, and the adult, are still frequently described as hydrocephalic.

the lower border of the thorax (costal cartilages) may be prominent, the lower aperture of the thorax being slightly enlarged. The vertebral column is straight, the back flat, there is little real lordosis, but even in the newborn infant, probably owing to forward tilting of the pelvis, the buttocks are prominent and there is a more or less marked (apparent) lumbar curvature and a prominent abdomen. This forward tilting has been attributed by some writers to the smallness of the hip-bones, as a consequence of which the acetabula are displaced backwards. Thus the abdomen and buttocks become prominent and an appearance of lordosis results. (See illustrations, Plates P, S and Y.)

(2) *In the Child.* Most infants of this kind are born dead or die soon after birth, or in the first year of life. But if they survive, and it is not quite clear why they should not, they usually do well. Their processes of ossification, as far as they go, seem to be rather in advance of the normal than otherwise. This agrees with the premature synostosis of the bones of the base of the skull that has been described, but the period at which this occurs is uncertain. At birth the child is fat, but as it grows up it usually becomes very muscular. Such children generally begin to walk and talk at the ordinary age. The teeth appear normally, and the intelligence is also normal.

(3) *In the Adult.* The clinical study of achondroplasia in the adolescent and the adult was begun by Porak¹ and Kaufmann², in women, from the obstetrical point of view. It was continued by Pierre Marie³ and Apert⁴. The features of the condition have been shown by them to be: (1) Smallness of height. Thus, in the case of Don Ward, aged 28 years, whose photograph is shown on Plate Q (6)—(8), this is 4 feet 0 inch. The Chinaman, aged 58 years, shown on Plate R (11)—(13), measures 3 feet 6 $\frac{3}{4}$ inches. Elisabeth Dörffler, *née* Kipke (Boeckh's case), aged 42 years, whose photograph is shown on Plate Q (9), is 3 feet 2·18 inches; her daughter, aged 17 years, the same, and her sister, aged 43 years, about the same; while in Bailly's case (quoted by Marie⁵), a woman, 27 years of age, this was 107 cm. (3 feet 6·12 inches)⁶. (2) A normal trunk. (3) A large head. (4) Excessive muscular development. This is even more marked in the adult than in the infant. The arms are muscular and held a little abducted from the trunk as a result of the disproportionate size of the head of the humerus. But (5) they are very short and when the fingers are fully extended their tips do not reach beyond the great trochanters of the femora, or, it may be, the crests of the ilia, whereas in the normal individual they reach as far as the middle third of the thigh. (6) The lower limbs are short and massive. They show angular deformities, more or less marked, just above and below the knees. These occur at the site of union of epiphysis and diaphysis and do not involve the shafts, as they do in rickets. This *appearance* of curvature is increased by the great development of muscles on the anterior and external aspects of the thigh. (7) As a result of the shortening of the lower limbs

¹ See Bibl. Nos. 247 and 252.

² See Bibl. Nos. 275 and 279.

³ See Bibl. No. 371.

⁴ See Bibl. No. 386.

⁵ See Bibl. No. 371.

⁶ Other cases are shown in the illustrations.

the midpoint between the vertex and the soles of the feet may be as much as a quarter of the total height above the symphysis pubis (Porak and Durante¹). (In the normal individual the upper border of the symphysis pubis is about midway between the vertex and the soles of the feet.) In these individuals the length of the trunk, measured from the episternal notch to symphysis, is of about the normal length for age, and the proportions to each other of the measurements between the vertex and symphysis and episternal notch and symphysis are normal. (8) The above shortening of limbs is of the "rhizomelic" as opposed to the "mesomelic" type, the proximal segment being more shortened than the middle segment. (9) The hands and feet are short, thick and broad, the fingers of equal length; the same condition is shown in the feet. (10) The digits of the hands diverge at their extremities in extension, showing the "main en trident" (see Plate P (5) and Plate R (11)) as in the infant. The metacarpal bones and phalanges are shortened, but this shortening is relatively less than that of the bones of the other two segments of the limb (thigh and leg; arm and forearm). The head, proportionately, is larger than normal, and in some cases the increase is absolute (one case described by Apert² had to have his hats made to measure owing to the large size of the head). In shape it is round, or brachycephalic. The frontal and parietal eminences are prominent. The face is relatively small but with large features. The bridge of the nose is broad and flat. The nose is retroussé, the nostrils are large. The shape of the head as a whole presents some rough resemblance to an inverted pear, as described by Porak. The teeth are normal. The palatine vault, though sometimes of the high-arched or Gothic type, is usually regularly formed and of the normal shape. The thorax is normally formed, but the lower border is often prominent. The scapulae are of defective development, but are proportionately less deficient than the humeri, because, in the former, chondral ossification commences later in life than in the latter. The spine shows no abnormal curvature. But the normal lumbar curve is increased, or is made to appear so, by the excessive development of the buttocks. The general muscular development is great (see illustrations). "They often perform in circuses as 'Auguste,' and amuse the audience by dangerous feats and exercises that demand strength for their execution. These are rendered grotesque by the diminutive stature of the performers" (Porak and Durante³). Obesity is common in the female sex (Porak and Durante⁴), but rare in the male (Marie⁵, Apert⁶). "The weight of achondroplasiacs accords with their general stoutness and is much above that of children of the same height, for their trunks are of normal size and their bones thick" (P. Marie⁷). The genital organs are normal. The female may become pregnant, and this fact makes the pelvic deformity of great importance. Achondroplasiacs differ greatly from cretins and most other dwarfs in their mental qualities. They are of average intelligence, but often show minor peculiarities in their mental attributes.

¹ See Bibl. No. 491.⁴ See Bibl. No. 491.⁷ See Bibl. No. 371.² See Bibl. No. 386.⁵ See Bibl. No. 371.³ See Bibl. No. 491.⁶ See Bibl. No. 386.

C. CHARACTERS OF THE SKELETON.

(1) *In the Foetus* the long bones of the limbs are short, thick and show angular deformity. The shortening is rhizomelic as a rule, but this is not invariable. The epiphyses are much enlarged in all their dimensions and afford a marked contrast to the shortness of the diaphyses. The latter are firm and hard and relatively thickened. The markings of muscular attachments are exaggerated. Between the epiphysis and the diaphysis a strip of connective tissue can on section be seen to extend, partially separating the one from the other. This has been regarded as an ingrowth of perichondrium, as an infolding of perichondrium, and as the result of inflammation. It has also, by some, been supposed to be a membrane. The tibia is more shortened than the fibula, which usually reaches to the knee joint, and its head forms part of the lower articular surface of this joint. The tibia and fibula are both deformed. An "angular" curvature is produced at the site of junction of epiphyses with diaphyses in both these bones at both extremities. In the case of the tibia the angle opens outwards, in the case of the fibula inwards. The interosseous space is thus increased. These angular curvatures are symmetrically placed, usually at the level of junction of epiphysis and diaphysis. This condition is not always seen in the forearm, but is occasionally present, as in Dixon's case¹. Growth has not ceased, but is retarded. The sclerosis is not equally marked at all points. In some parts cell proliferation occurs a little less badly than in others (Porak and Durante²). From this a deviation of the axes of the epiphysis and the diaphysis (instead of continuation of these in one straight line) results and an angle is formed. This is originally juxta-epiphysial, but if the deformity occurs long before growth is complete, growth continues in the new direction, and the angle finally occupies a variable position in the shaft. "In the adult its distance from the line of ossification affords an approximate indication of the time at which it arose" (Porak and Durante³). In most cases in the infant other curves can be observed in the diaphysis. (See bones of achondroplasia, Plates S (15), T (16), U (18).) The cranium is large, brachycephalic, with prominent frontal and parietal eminences; the face is small, receding and narrow. The bones of the nose, broadened at the base, are retracted, large, triangular or quadrilateral, and completely united. The upper jaws are approximated to the vertebral column more nearly than normal.

The bones of the base of the skull show arrest of development and premature union of the basi-sphenoid and basi-occipital bones. As a result of this the sphenoidal angle is more acute than usual (Kaufmann³). The occipital condyles are prematurely united to the basi-occipital bone. The basi-occipital is markedly inclined; it draws down the petrous, the posterior surface of which becomes more nearly vertical. The occipital fossa appears deepened with vertical walls, 40 mm. above the level of the occipital foramen (Regnault⁴). Occasionally there is premature union of the bones of the anterior region of the base of the skull as well. Though these premature

¹ See Bibl. No. 606.² See Bibl. No. 491.³ See Bibl. No. 275.⁴ See Bibl. No. 389, pp. 190 and 425.

unions are the rule, they may exceptionally be absent (Porak and Durante¹). The thorax. This is usually normal, but may be enlarged at the base. In some cases the ribs are enlarged and thickened, their grooves are exaggerated and there are small discrete nodular thickenings on their inner surfaces. But there is usually no thickening at the costo-chondral junctions as occurs in rickets. The clavicle is sometimes normal, but may be thickened and show exaggeration of all its curves and muscular markings. Vertebral column: the laminae and spinous processes are usually enlarged but there is no curvature. The spinal canal and occipital foramen are sometimes narrowed (Porak and Durante²).

(2) *In Adults* the same skeletal changes are present, but all are more marked than in the infant. The radio-humeral index, 100 Length of radius/Length of humerus, in normal Europeans varies from 82 to 88³. In achondroplasia it is raised to 100 or even 140. The tibio-femoral index, 100 Length of tibia/Length of femur, is normally between 84 and 90. It may here be 105 to 120 (Porak and Durante⁴). In some cases, however, the index is normal; in others the radio-humeral may be as low as 66, 58, 53, the tibio-femoral 78 or 64 (Regnault⁵). Other features are the same in the adult as in the foetus. The apparent exaggeration of the lumbar curvature, which causes the appearance of lordosis, is produced by the following factors: (1) tilting of the sacrum, forwards of the upper end and backwards of its lower end. This is owing to the fact that the innominate bones are of deficient growth, while the sacrum is less so. Hence the sacro-iliac articulation occurs in a different plane from the normal, the sacral promontory becoming tilted forwards and downwards. (2) Prominence of the buttocks. This Poynton⁶ attributes to the fact that, since the innominate bones are defective in size, the ilio-pectineal lines are relatively shorter than normal. The acetabula, through which, when the individual is standing, the weight of the body is transmitted, are thus displaced relatively backwards, i.e. nearer the sacro-iliac articulation than normal; hence the buttocks become very prominent. (The prominence of the abdomen seems probably owing to the fact that the ilia, as well as the other parts of the innominate bones, are deficient in size. Hence the false pelvis as well as the true pelvis is small, and the abdomen projects unduly in consequence.) The pelvis is characterised by tilting of the sacrum forwards, marked absolute diminution of all diameters and relative diminution in the antero-posterior diameter of the inlet. According to Poynton⁷, the true conjugate seldom exceeds 2 $\frac{3}{4}$ inches, and may be as small as 1 $\frac{1}{2}$ inches. The pelvic defect does not affect all the pelvic bones equally. The innominate bones are small, the sacrum not. As a result of the relatively great development of the trunk and head, and because the weight is transmitted through the acetabula, the pelvis becomes tilted, and the sacral promontory is displaced⁸. The upper end of the sacrum is displaced forwards,

¹ See Bibl. No. 491, p. 18.

² See Bibl. No. 491, p. 19.

³ [Porak and Durante must be in error here; the radio-humeral index has for mean value in modern French 72 and for mediaeval French 71. The tibio-femoral index for modern French has a mean value 80 and for mediaeval French 88; all values less than the total range given above. **ERROR.**]

⁴ See Bibl. No. 491, p. 19.

⁵ See Bibl. No. 389.

⁶ See Bibl. No. 534.

⁷ See Bibl. No. 534.

⁸ [This explanation seems hardly consistent with the fact that the conjugate diameter of the pelvis, especially the ilio-pectineal portion, is greater in the female than the male, and the inclination of the pelvis is generally greater in consequence: *Quain's Anatomy*, 10th Edn. Vol. II, p. 117. **ERROR.**]

and its lower end backwards. The antero-posterior diameter of the inlet thus becomes markedly diminished, relatively more than the other diameters. *Radiographic Appearances.* These features are shown in the illustrations: see Plates U, V and X. In the foetus the long bones are defective¹. They are short, thickened and squat, and sometimes distorted. The epiphyses are very large, and are separated from the diaphyses by a very large clear space of transparent material. The phalanges, metacarpal and metatarsal bones are also shortened and of almost square shape instead of the usual form of elongated rectangles. The clavicles and ribs are short and thickened, but the vertebrae are diminished in thickness, and appear more distant from one another than normal (Bouchacourt²). These changes are, however, not constant. The bones are more transparent than in normal individuals (Levi and Bouchacourt³). In older children the epiphyses are clearly marked and of great size. Their opacity is greater than in the normal child (Cestan and Infroit⁴, Méry⁵). Ossification and calcification are more advanced than is usual for their age. The diaphysis is short, sometimes of normal thickness, sometimes thickened, either straight or curved, but if present the curvature is situated less in the diaphysial body than at the junction of epiphysis and diaphysis. Cartilaginous development is retarded. The diaphysis grows in length and thickness slowly, remaining separated from the epiphysis by a transparent line until adult age. Union is said to be usually premature. In one of P. Marie's⁶ cases, aged 18 years, the head and shaft of the humerus were ununited as is usual for that age. But in another, aged 40 years, union was still incomplete. In a third, aged 25 years, union had occurred. (The average age at which, in normal individuals, junction becomes complete at this end of the humerus is the 20th year.) Thus the rule as to premature union is certainly not absolute.

D. PATHOLOGICAL ANATOMY.

Only the skeleton is affected. All bones developed from cartilage show the same histological changes, but these are best seen in the long bones. The costo-chondral line of ossification, however, usually involved in rickets, is free in the case of achondroplasia. The microscopic lesions are more pathognomonic than the clinical signs and may be the only means of diagnosis in atypical and doubtful cases (Porak and Durante⁷).

Before describing the microscopic changes of achondroplasia, a brief outline of the development of normal bone will be given for purposes of comparison.

In the normal development of bones, ossification occurs by two processes: (a) *Chondral Ossification.* This determines growth in length at the junction of epiphysis and diaphysis. (b) *Periosteal Ossification.* This determines growth in thickness, of the shaft or diaphysis in long bones, and of the bone as a whole in flat bones. In all the latter, except those of the cranial vault, however, both processes take part. The changes that occur may be broadly outlined as follows:—(a) *Chondral Ossification.* In the zone of ossification three successive layers may be distinguished

¹ See Bibl. No. 491, p. 15.

² See Bibl. No. 479.

³ See Bibl. No. 480.

⁴ See Bibl. No. 888.

⁵ See Bibl. No. 410.

⁶ See Bibl. No. 871.

⁷ See Bibl. No. 491, p. 15.

in passing from the area of undifferentiated cartilage of the epiphysis to the diaphysis. (1) The zone of proliferation of cartilage cells. Here the cells of the cartilage are increasing in numbers, and extend in a vertical direction, but irregularly. They are close together, but are separated by a noticeable quantity of clear, intercellular, hyaline cartilage—a matrix of clear hyaline cartilage. (2) The zone of columns of cartilage cells. The cells, increasing in number and in size, here become more transparent and are formed into regular columns. The cells nearer to the next zone, the line of ossification, are larger than those more remote. The columns are all exactly parallel to one another; they are very near together, but are separated by a small amount of clear hyaline substance (hyaline matrix). Towards the next zone, however, a deposit of calcareous material is to be observed in this matrix, *i.e.* it begins to calcify. These two zones, numbers (1) and (2), together form a thin blue, translucent zone of 1 to 2 mm. in thickness, the chondral layer. (3) The line of ossification or bony layer. This shows itself as a thin zone of a dull yellow colour about $\frac{1}{2}$ cm. thick. Each of the columns of cartilage cells extends here as far as the medulla or bone marrow. From the latter vascular loops grow, eroding the columns of cartilage cells quite regularly, and each to the same level. The septa, which separate these columns, thus eroded and denuded of their cells, become somewhat irregular and incrustated with calcareous salts; they form the scaffoldings of the future bony trabeculae. On their surfaces osteoblasts are deposited by the vascular loops, and for these they serve as supports or buttresses. The osteoblasts lay down true bone by successive deposits of bony lamellae, while the calcareous material of zone 2 is absorbed by osteoclasts. A microscopic section at the region of growing bone under a low power, therefore, shows the following zones: (1) zone of proliferation of cartilage cells; (2) zone of columns of cartilage cells; (3) the "line of ossification"; (4) marrow and bony trabeculae, with the minute changes above described.

(b) *Periosteal Ossification.* The osteogenic layer of the periosteum is composed of a fibrous tissue matrix and of special cells—the osteoblasts. As the diaphysis is approached, the fibrous tissue matrix becomes impregnated with calcareous salts more and more thickly. It separates the columns of cartilage cells. It also serves to support the osteoblasts, which secrete ostein or true bone substance. This surrounds the cartilage cells, and transforms them into bone cells. Trabeculae are formed, and elongated spaces are produced, which afford a path for vessels from the periosteum. Ossification is completed by successive deposits by the vessels of ranges of osteoblasts to these primitive trabeculae. The osteoblasts lay down true bone. Concentric osseous lamellae are in this way produced, and the Haversian systems of compact bone are formed. In *achondroplasia* periosteal ossification is normal, or even, if anything, of increased activity in some cases. In the periosteal dystrophy periosteal bone formation is almost completely lacking; only slight, irregular and discontinuous lamellae are present. There is very little compact bone. That laid down is in part destroyed by resorption by osteoclasts. Chondral ossification is normal. (Section Plate U (25), reproduced by the courtesy of the Editor of *Le Nouvelle Iconographie de la Salpêtrière*, Paris.) In *achondroplasia* longitudinal

section of an area of chondral ossification such as the upper end of the humerus shows the following changes from the normal: (1) The area of inactive hyaline cartilage is unaltered, but between this and the zone of columns of cartilage cells (Zone 2 of the normal as above described), separating the two, there is, occupying what should be the zone of proliferation of cartilage cells (Zone 1 of the above), a fibrous band or area. This is more marked in some places than in others, and may occur on one side only; it is vascular and enclosed within it are small areas of cartilage. It is directly continuous with the perichondrium or lining membrane of the epiphysis, and thins out towards the centre of the bone end. It has by some been looked upon as a membrane. (2) The arrangement of cartilage cells in columns (in Zone 2 of the above description of the normal) is here completely lacking; the cells are scattered and dispersed without order, and are few in number. The matrix or intercellular ground substance of this zone is not hyaline, but shows fibrillation, and where it approaches the perichondrium, it takes the form of white fibrous tissue. In places this matrix shows mucoid degeneration and vacuolation. Where this fibrillar, or, perhaps, fibro-cartilaginous, matrix approaches the next zone (Zone 3, the "line of ossification" of the above description of the normal), there is a deposit of calcareous salts in places, but this is not uniform as in the normal. (3) The line of ossification is thin and may be somewhat irregular. (4) In some cases the formation of bony trabeculae is normal, and the medullary spaces are normally constituted; in other cases, Zone 3 is replaced by mucoid tissue; sometimes, again, all the changes in Zone 4 are in excess, but are otherwise normal. (See Section, Plate U (23).) The epiphysial cartilages, as a whole, are very vascular. Such are, broadly, the microscopical changes in outline. Kaufmann¹ divided cases into three groups: "hypoplastic," in which growth is merely retarded along the lines described above; "hyperplastic," in which the above changes are in excess; and "malacic," in which, still further, the cartilage softens. Others have followed this classification. Regnault², however, regards all three of these as grades of one and the same condition, of which only the first is compatible with life. There are no special changes in parts other than bone. Such changes as occur may be found alone or in association with any other pathological condition or abnormality. Emerson³ gives the following associated abnormalities: hypospadias, cervical cysts, spina bifida, defective auricles, defects of development of ensiform cartilage, umbilical hernia, inguinal hernia, cleft palate, genu valgum, new growths of various kinds. Porak and Durante⁴ record congenital dislocation of the hip, adenoids, enlarged uterus, enlarged thyroid, multiple cystic disease of the kidneys. Nathan⁵ records congenital hernia and high-arched palate. Myxoedema, in association with achondroplasia, has been recorded more than once, and is shown in a case on the pedigree plates. Mental deficiency is also shown there by Dr Hunter's Case. Porak and Durante⁶ found in two cases in the infant "congestion, recent haemorrhages and small celled infiltration in the spinal cord, liver, muscles and kidneys," and consider that this favours the view of infection rather than auto-intoxication as a cause.

¹ See Bibl. Nos. 275 and 279.

⁴ See Bibl. No. 491, p. 26.

² See Bibl. No. 389.

⁵ See Bibl. No. 475.

³ See Bibl. No. 604.

⁶ See Bibl. No. 491, p. 26.

E. FORMS AND COMPLICATIONS OF ACHONDROPLASIA.

The following varieties have been described: (1) The classical type. (2) Incomplete forms, in which a certain number of the typical features are modified or absent, *e.g.* micromelia may be only slightly marked (as in Houston Porter's cases in the pedigrees, or the head not very large or not of typical shape, see adult skeleton Plate U (18) and Dr Hunter's Case in the pedigree plates), or the nose atypical, or the hands and feet normal. (3) The ribs and vertebrae are affected, the former showing excessive grooving and thickening at their points of union with one another (a feature shown by the above adult skeleton), the latter a thickening of lamellae and spinous processes (Bouchacourt¹, Legry², Regnault³). (4) The premature synostosis of the bones of the base of the skull is lacking (von Franqué⁴, Lampe⁵, and Salvetti⁶). (5) Micromelia of the lower extremities alone (Variot⁷), humerus alone shortened (Regnault⁸). (6) Osteoporosis of the diaphysis with lesions otherwise those of true achondroplasia (Porak and Durante⁹). (7) Complication by other conditions such as rickets (Plates S and Y) and cretinism or myxoedema (Porak and Durante¹⁰ and others). (8) True achondroplasia, as well as micromelia alone, is sometimes seen in lower animals (Leblanc¹¹). See section below on Heredity.

Diagnosis. In typical cases the diagnosis of achondroplasia either in the foetus, child, or adult, presents no difficulties; its characters, which seem to have been sufficiently described, are distinctive at a glance. But not one of these features *alone* is diagnostic, for each may occur in other conditions. The features of most of the other commoner varieties of dwarf growth are outlined either in the illustrations or in the general classification of dwarf growth. From these the diagnosis can be made on general principles, and presents no difficulty in typical cases. In atypical cases of achondroplasia confusion appears most liable to occur with certain cases of rickets and with periosteal dysplasia. Such cases are rare. According to Porak and Durante¹² in some instances the differential diagnosis is only possible on histological examination. The three conditions are fairly clearly shown in the illustrations. With regard to the clinical features in doubtful cases Porak and Durante¹² point to the following as in favour of the diagnosis of achondroplasia:—(1) Extreme muscularity; (2) character of curvatures (as described); (3) absence of fractures; (4) regular dentition; (5) shape of skull (as described); (6) micromelia (*i.e.* real shortening) as opposed to pseudo-micromelia (the result of curvatures); (7) radiographic examination showing epiphysis much enlarged, with regular or premature appearance of centres of ossification, diaphyses short and thickened and of normal consistence. Achondroplasia and rickets may co-exist, as occurs in the twin child shown on Plate P. The characters of the pelvis differ in these two conditions; in achondroplasia all diameters of the pelvis are diminished more or less equally, because, though all the bones entering

¹ See Bibl. No. 479.⁴ See Bibl. No. 278.⁷ See Bibl. No. 440.¹⁰ See Bibl. No. 491.² See Bibl. No. 422.⁵ See Bibl. No. 303.⁸ See Bibl. No. 411.¹¹ See Bibl. No. 421.³ See Bibl. No. 389.⁶ See Bibl. No. 298.⁹ See Bibl. No. 491.¹² See Bibl. No. 491.

into it are small, they are never at any period softened. Owing, however, to tilting of the sacrum, the inlet of the pelvis is diminished, though the antero-posterior diameter itself is not reduced more than the others. In the rickety pelvis, arrest of growth to any great extent does not occur, but owing to the softening that has occurred, bending of bone under superincumbent weight takes place at points of pressure. The sacrum is pushed forwards, its curve increased. The antero-posterior diameter is thus diminished, but the transverse is sometimes increased. Another cause of multiple fractures in the newborn, besides the above conditions, seems to be *fragilitas ossium congenitalis*, a condition in which the tendency to fractures persists through life; the condition has been reported to be hereditary, and to be, in some cases, associated with *haemophilia*. It is a rare condition, for only one case attended the Orthopaedic Department of the London Hospital in two years.

Pathogenesis. Many of the older views as to the pathogenesis have been referred to on page 371. Of more modern ones there are the following: (1) Trauma. There is no evidence for this, and there seems no possibility of this factor playing any part here. (2) Parrot¹, who first employed the name "*achondroplasia*," regarded the condition as a local one, a "*congenital dystrophy of primordial cartilage*," i.e. a congenital abnormality of the cartilage of growth. Kaufmann² also believed the condition to be due to a dystrophy of cartilage, characterised by irregularity and retardation of growth of epiphysial cartilage with proliferation of the bone marrow to invade this and the hard bone of the shaft. (3) The process is one of "arrest" of chondral ossification during intra-uterine life. (4) It is a "sclerosis" of the zone of ossification at the epiphysial line. (5) The latter is an effect of some cause unknown. (6) Most authorities at the present day appear to favour the view that the primary cause of *achondroplasia* is some maternal intoxication, the nature and origin of which is unknown. This view is supported by: (a) the histological appearances of the lesions in the region of cartilaginous bone growth; (b) the condition has been found in mother and child and in twins; but analogous facts are recorded for nearly all congenital defects of whatever kind; (c) in some few cases the mother has been syphilitic, in others tuberculous; this, however, appears to be of no significance whatever, since in the majority of cases this has not been the case. This seems to be all the evidence there is in favour of this view. As to the nature and mode of action of this intoxication, it has been supposed (i) to be a placental defect; (ii) that the intoxicating agent is localised in the cartilaginous area of the growing bone. (7) It is a "trophic" disturbance, of nervous origin. For this view there seems to be no evidence worthy of attention at all. (8) General maternal debility, not exceeding physiological limits, is the cause. The evidence for this view is defective. (9) The condition is caused by an auto-intoxication of glandular origin. This view was put forward by Marie³, Leblanc⁴, Joachimsthal⁵, etc., but appears to confuse the condition with cretinism. Though removal of the thyroid gland in infancy produces dwarfing of growth, cretinism differs completely from *achondroplasia*. Other glands under

¹ See Bibl. Nos. 161, 172.

⁴ See Bibl. No. 421.

² See Bibl. Nos. 275, 279.

⁵ See Bibl. No. 863.

³ See Bibl. No. 371.

suspicion are: thymus, testis and pituitary, which seem to be suspected not only in all forms of growth in which the primary cause is unknown, but in many other conditions the origin of which is obscure. In this case there is no reliable evidence whatever in favour of any of them. (10) The condition is due to an infection. (11) It is due to some auto-intoxication other than of glandular origin. At the present time of the suggested causes the most plausible seem to be (10) and (11).

Of (11) nothing is known; the matter seems to be one of pure speculation. With regard to (10) it can only be said that this seems to be the most reasonable at the present day. The sclerosis, which is present in all cases¹, may be produced by a toxin; this may be supposed to be of bacterial or other origin. The most markedly sclerogenic of such toxins at present known seems that of syphilis, others are those of tuberculosis and alcohol. It seems improbable that the syphilitic toxin, or either of the other two, is this particular sclerosing agent. The condition might be supposed to be produced by one organism specific for this dystrophy or by several indifferently, either those suggested or others at present unknown². In the case of the periosteal dystrophy there is no sclerosis, and the view is held (notably by Porak and others) that the histological changes follow the type of some glandular or trophic disturbance, and that hereditary or auto-intoxication must be considered possible. "The condition has analogies with the myopathies" (Porak). It seems that, whatever the exciting cause, this morbid susceptibility of cartilage is hereditarily transmissible in some families much in the same way as is the "pre-disposition" or "vulnerability" to tuberculous or rheumatic infections, etc. The various hypotheses that have been advanced on this subject in recent years are nearly all expressions in one or other form of the idea of lowered resistance locally.

F. HEREDITY IN ACHONDROPLASIA.

It would seem that the condition may appear "accidentally" in a family or it may be "hereditary." The achondroplastic individual has normal reproductive powers. Heredity has shown itself in: the father; the mother; in more than one member of the same generation; father and daughter; grandfather, father, brother and sons; in twins, both of which were achondroplastic. (For these cases see pedigrees.) In a new case of twin progeny shown with the plates (Dr R. Hutchison's case, Plate P) one twin was achondroplastic and the other normal. S. Müller³ and Klein⁴ have recorded similar instances. An achondroplastic parent of either sex may have normal children; and this seems to be the usual occurrence. The circumstances in which heredity can show itself directly in this condition are limited, because no achondroplastic woman can come to a normal confinement, and formerly, before the

¹ "La lésion essentielle de l'achondroplasie est une sclérose, puis une dégénérescence calcaire du cartilage de conjugaison avec intégrité complète ou relative de l'ossification périostale." Porak and Durante: see Bibl. No. 491, p. 44.

² It seems possible that the sclerosing agent may be none of those that have been suggested. For it is conceivable that it may differ in character as widely from sclerosing agents at present known as does the spirochaeta pallida from, say, alcohol or the bacillus tuberculosis and other cause of chronic inflammation. Until the spirochaete was demonstrated, conceptions as to what the syphilitic organism might be naturally pictured it for the most part on the lines of pathogenic organisms already known, e.g. as a bacillus or a coccus. It proved to be none of these. It may be conceived that the agent of achondroplasia, at present unknown, may afford an analogy, and be one of which present knowledge allows no precise conception.

³ See Bibl. No. 282.

⁴ See Bibl. No. 397.

operation of Caesarean section had been devised, such women in labour at full term must have died, or if not the child must have been delivered after craniotomy. The female sex seems to be more predisposed to achondroplasia than the male. Kassowitz¹ found amongst 29 cases, 25 girls and 4 boys. Most of these children are either born dead or die soon after birth, and in former times if the mother was achondroplastic she died as well for reasons stated. These facts seem to refute the view which would regard achondroplastic individuals as examples of "atavism," the persistence of an old dwarf race, or the evolution of a new one. This view would consider such individuals as analogous to the "Akkas" and other dwarf races (see Plate O). The differences between the former and the latter are marked, for the "Akkas" and all other existing dwarf races are of normal proportions (dwarf races may very probably show individuals affected with rickets, congenital syphilis, etc., or any of the other varieties of dwarf growth due to disease; but these are only diseased individuals or stocks and seem to have no race characters). In the animal kingdom under natural conditions it would appear that when new qualities occur in individuals it is only the advantageous, those of assistance in the struggle for existence, which become fixed in the race, because they confer advantages. Others tend to die out, with the individuals possessing them, because they are disadvantageous. Micromelia would seem to be of the latter kind. It may be, however, that under civilised conditions, the effect of physical disadvantages being largely eliminated, achondroplastic individuals may be analogous to the races of short-limbed animals of various kinds produced by breeders under artificial conditions, *e.g.* short-limbed hounds and other varieties of short-limbed animals. Here the objection that normal accouchement is impossible in achondroplasia seems very important. Again, achondroplasia seems to have been observed in varieties of domestic animals living under their usual environment; yet no achondroplastic race has been produced. Achondroplasia is a disease, as its histology shows, and though it sometimes shows hereditary transmission seems no more likely to produce a race than tuberculosis, to which in some ways it seems analogous. The superficial resemblances to achondroplasia shown by short-limbed domestic animals are obvious, *e.g.* dachshunds, Aberdeen terriers, Skye terriers, bull dogs, Pekinese spaniels, Basset hounds and other short-limbed dogs of various kinds. But the resemblance is not real. Regnault² has studied the skeletons of some of these and has demonstrated in them shortening of the bones of the limbs of rhizomelic type with excessive markings for muscular attachments. The trunk and cranium are normal, the pelvis flattened in its antero-posterior diameter. But there does not appear to be the difficulty in parturition such as occurs in achondroplasia. I. Geoffroy-Saint-Hilaire³ has described incomplete or partial examples of these short-limbed animals, occurring under domestication, the fore limbs alone of which are shortened. Leblanc⁴ and several other observers have described the "basset" condition in such animals as cattle, sheep, pigs, dogs, fowls and pigeons. Achondroplasia occurs in cattle. Thus the "bull-dog calf" has been said to be truly achondroplastic (Emerson⁵).

¹ See Bibl. No. 251.

⁴ See Bibl. No. 421.

² See Bibl. Nos. 289 and 423.

⁵ See Bibl. No. 604.

³ See Bibl. No. 75. Vol. 1. p. 173.

These all show a short upper jaw and micromelia. Regnault¹ states that achondroplastic and "bull-dog" cattle form separate groups; the former show all the pathological changes that occur in human achondroplasia, and instances of it occur at times in all kinds of cattle². In the latter the base of the skull, in particular, is normally developed. Further, short-limbed dogs occur in dogs of all types; coursing dogs, terriers (Aberdeen terriers, Skye terriers, etc.), poodles, spaniels, *e.g.* Pekinese spaniels, hounds (otter hounds and dachshunds), etc. They do not represent a *race* but peculiar varieties of several different races produced by artificial selection. In the aetiology of some varieties of dwarf growth of pathological origin heredity seems to play a part. Of these achondroplasia is one. It seems likely that the heredity may be one of vulnerability, of toxins (bacterial or other) or of a "dystrophy." But it does not seem possible to say for certain, at the present time, which of these views is correct.

In the plates of family histories many pedigrees are included which show no evidence of heredity. This, however, does not preclude its possibility. It is not of course contended that all cases show the hereditary influence. Negative as well as positive facts are here recorded. It does not seem feasible to determine, at the present day, the proportion between "hereditary" and other cases. In this condition as in others it seems desirable that the whole family should be considered, normal as well as deformed individuals being included, if any advance in the knowledge of its heredity is to be made.

Frequency. No reliable information is at present available.

[NOTE A. *Achondroplastic Forms in primitive Sculpture.* We have already referred to the Egyptian gods Ptah-Sokar and Bes (pp. 357 and 370, Plate S). Owing to the kindness of Professor Petrie we are able to reproduce (Plate QQ (94)–(96)) a series of jugs with more or less achondroplastic figures. Other examples occur in the British Museum collections (*e.g.* Jug No. 30459, which may be compared with the Bes and Ptah-Sokar figures 15291, 22610, 22930, 1419 etc.). The combinations of apparent lordosis and steatopygia (see our p. 375) with such figures are not uncommon. The representation of the Queen of Punt, B.C. 1516–1481 (Plate QQ (96)) is a remarkable instance of this kind, though the exact nature of her dwarfism, if it be such, is obscure (see account of Plates); the bas-relief of her daughter, which has perished, presented similar unusual features. Prehistoric Mexican pottery, and even modern Burmese fetish-like figures, are in many respects comparable with the Egyptian products. A complete study of primitive sculpture and its relation to achondroplastic forms would be of great interest. EDITOR.]

NOTE B. *Periosteal Dysplasia* (see p. 373). Various names seem to have been applied to this condition, *e.g.* *osteo-porosis congenitalis*, achondroplasia being termed under this system *osteo-sclerosis congenitalis*. Such terms as *micromelia chondromalacia* or *pseudo-rachitica*, *osteo-genesis imperfecta*, etc., appear to have been indiscriminately used by some of the relatively older writers for both achondroplasia and periosteal dystrophy, the distinction between the two conditions not having been drawn. It seems probable that under the term *fragilitas ossium congenitalis* (or, as it is sometimes now described for want of exact knowledge by the general term, *osteo-genesis imperfecta*) more than one condition is included. These have as a common feature the occurrence of multiple and repeated fractures from comparatively slight trauma, and seem to present, in this and other respects, resemblances to the periosteal dysplasia on the one hand and to rickets on the other. But the real nature of these conditions is obscure and the clinical resemblances are possibly fallacious.

¹ See Bibl. No. 428.

² H. Müller, 1860 (see Bibl. No. 120), first considered at length the "bull dog" calf; he attributed the deformity to a "cretinoid habitus." Leblanc, 1902 (see Bibl. No. 421), found achondroplasia, myxoedema, but more especially defect of the thyroid gland in "bull-dog" cattle. Apert, 1902, asserted (see Bibl. No. 418) that the two first are totally different affections, and that the "bull-dog" cattle are achondroplastic. Legry and Regnault, 1902, maintained (see Bibl. No. 422) that the thyroid gland is normal in achondroplasia and in the same year the latter differentiated "bull-dog" and achondroplastic cattle. Two years later, 1904, Seligmann supported (see Bibl. No. 470^{ba}) the thesis that the "bull-dog" cattle are cretins, with an examination of the thyroid. Emerson in 1909 (see Bibl. No. 604) returned to the achondroplastic view. A full explanation must account for Dexter cattle a "dwarfed" race, producing one calf in six of "bull-dog" type. EDITOR.]

IV. ATELEIOSIS (HASTINGS GILFORD); "TRUE" DWARFISM¹
 ("ECHTER ZWERGWUCHS"; "NANISME VRAI").

It has been shown that in the case of achondroplasia its study was begun by the *clinician*, impressed by the peculiarities of newborn infants (usually of female sex and born dead) with a big head, a body of ordinary size, but with short, thick, curved limbs and hands of peculiar form, which he considered to belong to a group apart. Instances of similar cases having accumulated and the pathologist having taken up the study, a torrent of facts and names poured in; and considerable knowledge of the morbid anatomy and pathology of such infants was acquired before the study of achondroplasia (as it is now termed) in the adult had been begun. It was again the *clinician* who began this, in the adult female from the obstetrical standpoint of the contracted pelvis. The identity of these infants, of the peculiar form described, with the large-headed, short-limbed dwarf adults known in everyday life from time immemorial, and so well known to obstetricians, was not immediately realised, probably in part because such infants are nearly always born dead, and partly because they are not, properly speaking, "dwarfs" at all at birth. It was only subsequently that the fact emerged that those few who live grow into those well-known dwarfs, and the study of the subject as a whole was brought into line.

The study of ateleiosis, on the other hand, may be said to have been begun in the post-mortem room. For although there are in the literature some few accounts dealing with difficult labour in dwarfs which can now be judged to have been ateleiotic, yet these accounts are written from the obstetrical standpoint, and though a few particulars of general characteristics are given, no inquiry into the nature of the dwarf growth or its anatomical features, apart from those of the pelvis, was ever made. There was no attempt to study the dwarf growth as such. Again, though there are numerous accounts and representations of ateleiotic dwarfs (as we can now perceive them to have been) in literature and in art, of the dwarfs of courts and those shown in exhibitions, etc., no attempt was made to discover the nature of the defect from which they suffered nor to determine their place in Nature.

In 1868 Schaaffhausen² of Bonn described an autopsy performed upon a dwarf who had died in Coblenz at the age of 61 years. The height was 94 cm. (37·6 inches), the total body weight was 45 "Pfund" (46·4 pounds). He had lost several front teeth, but showed no grey hair and was not bald. The permanent teeth began to appear in the 22nd year, and the first to erupt was the first incisor. (Normally the first permanent tooth appears in the sixth year, and the first to erupt is the first molar.) The head and most of the bodily parts had retained the size and proportions of childhood. The dwarf showed no indication of having reached manhood. There

¹ "True" dwarfism or "ateleiosis." The term "true" dwarfism only indicates one symptom, namely dwarfing of growth, of an abnormality of which the cause and the mode of action of this are unknown; and "ateleiosis" is almost as vague. But it serves, until this mode is known, to distinguish the condition from others that have as a symptom dwarfing of growth. An analogous condition in this respect is "cretinism." The dwarfs known as "cretins" were long familiar before the cause of their dwarfing of growth and other symptoms were discovered to be defect of thyroid gland secretion. The term "cretinism" expresses nothing of aetiology, pathology or symptoms, but still survives. And in the case of "ateleiosis" a no less vague term can of course be employed until the pathogenesis of the condition is known. The morbid anatomy is not, as it is in the case of achondroplasia, sufficiently distinctive for a succinct name to be applied to the condition.

² Bibl. No. 186.

was bilateral cryptorchism. Spermatozoa could not be demonstrated in the testes. There was no pubic hair. The face, though showing evidence of age and with numerous furrows and wrinkles, was that of a child. The broad bulging forehead, the flat undeveloped nose, broad lower lip and weak chin assisted in producing this appearance. The head circumference of 520 mm. corresponded to that of a boy of five years of age. The head length was 170 mm., which occurs in the first years of life, the breadth 150 mm., a measurement which is found in adults. The brain weighed 1183 grammes and was normal with regard to furrows and convolutions; the brain weight was $\frac{1}{16}$ of the total body weight. In the newborn the normal average of these proportions is $\frac{1}{8}$, in normal adults $\frac{1}{40}$ to $\frac{1}{44}$. The cranium itself was somewhat asymmetrical, with prominent parietal eminences. The sutures, including the spheno-occipital fissure, were all ununited, showed few serrations and these as little marked as is usually seen in skulls of the first years of life. Further post-mortem findings showed: The viscera were of the size of those of a child of about six years of age. The heart showed hypertrophy of both ventricles, with aortic and pulmonary stenosis. There was "chronic endarteritis deformans" and "inter-meningeal haemorrhage."

Some fourteen years later (1882) Schaaffhausen¹ examined the exhumed skeleton of this dwarf. The measurements were:—Femur 220 mm., tibia 160 mm. These correspond to those of a normal child of four and a half years. Length of skull 164 mm., breadth 147 mm., height 121 mm. The first measurement corresponds to that of the skull of a child of six or seven years of age; the two last occur in normal adults. Skull capacity 1390 cm. This figure occurs frequently in lower races and in European children between four and five years of age². Nearly all the epiphyses were still ununited to diaphyses; many could be easily detached. Only two parts of the skeleton were of normal size for adult age, namely, the teeth and the ossicles of the ears. This individual had one normal sister and seven brothers of whom four were dwarfs like himself, and two, who died before six years of age, yet it was clear they would have remained small. The parents were of normal growth and without apparent abnormality of any kind. (The family is described in the Pedigrees. See Schaaffhausen's Case, Pedigree No. 705.)

Thus, on the whole, the appearances presented by this dwarf were those of a growth which had ceased in childhood from about the fourth to seventh year. But the teeth were of adult growth and on this a contradiction to that view occurs; while the fact that some of the cranial measurements were those of childhood and others those of adult years, as well as the date of eruption of the permanent teeth and their order of appearance show an abnormality or irregularity of development beyond simple retardation of growth as a whole.

In 1891 Paltauf³ described a similar case in his monograph *Ueber den Zwergwuchs*. This was a dwarf named Mikolajek, 49 years of age, born in Andrichau in Galicia. He had been, for 21 years, servant to a colonel of the Austrian Army and had served through two campaigns in this capacity (1859 and

¹ See Bibl. No. 195.

² This is hardly correctly put by Schaaffhausen, many female and even male adult European skulls have a capacity under 1400 cms. Editor.]

³ See Bibl. No. 262.

1866) and had subsequently worked as a gardener. He had twice suffered from "rheumatic affections of the knees" and subsequently on two occasions from "general oedema." In both instances this was relieved after a few weeks. Three weeks before coming under notice, however, the general oedema returned, and for it he was admitted to hospital. He died 12 days later. He showed the following peculiarities:—Height (at the age of 49 years) 112·5 cm. taken during life; for the head: horizontal circumference = 540 mm., bi-parietal breadth = 150 mm., mento-occipital diameter = 225 mm.; well proportioned, bones thin and light, but musculature fairly well developed. There was a slight scoliosis with convexity to the left in the upper dorsal region; the lower dorsal and first lumbar vertebrae showed a slight compensatory curve, convex to the right, while the lumbar column showed, in addition, marked lordosis. The development of the external genitals was that of childhood; the prepuce was phimotic; the left testis was in the scrotum, the right in the inguinal canal. Autopsy showed, in addition to dwarfing of growth, "chronic lymphatic glandular tuberculosis, acute disseminated pulmonary tuberculosis, hypertrophy with dilatation of the right side of the heart, fatty degeneration of the myocardium, and recent haemorrhage into the pons Varolii." The total body length after death was 111 cm.; the body was rather thin and markedly oedematous; the bones were very thin and light. The head was relatively big, the face short and broad, with prominent malar bones; the bridge of the nose was depressed, broad and saddle-shaped; the nose itself was blunt. The neck was short, the thorax fairly convex, at least in no wise flat; the abdomen was hemispherically arched forwards. The external genitals showed the development of childhood; the prepuce was very long, the urethral orifice much contracted. The feet and hands were very small. The cranial measurements were:—horizontal circumference 506 mm., horizontal length 169 mm., maximum transverse diameter 142 mm. It was roughly rhomboidal on transverse section, but slightly asymmetrical, the left half being somewhat in advance of the right. All the normal sutures were present; the frontal suture was still present. The cranial contents and the abdominal and thoracic viscera showed the appearances already stated. Apart from general oedema and other changes stated there was no noteworthy abnormality in any part except the skeleton. The thyroid gland was, however, "very small and pale red."

A complete description of the skeleton with very full measurements of all its parts is given by Paltauf. These need not be reproduced here. It is enough to say that, as a whole, compared with the normal, the skeleton corresponded to that of a boy of seven years of age. The skull at first sight appeared disproportionately large, but the appearance was deceptive. All the fissures, emissary foramina and canals at its base were abnormally patent or large. *The sella turcica (or cavity of the hypophysis cerebri or pituitary body) was very large in all dimensions, not only as compared with that of a child of the same stature, but the measurements were considerably greater than the average of those of several adults of normal growth.* The sphenoccipital junction was still un-ossified and was cartilaginous. Both the sphenoid and the basilar portion of the occipital bone showed measurements markedly smaller than

those of a child of the same height. The foramen magnum, from front to back, was on the contrary very large. The upper jaw was relatively big and markedly prognathous, the alveolar processes very powerfully developed and in the formation of the teeth-sockets as well as of the bony lamellae was that of an adult. The lower jaw was also comparatively strongly developed, with well-marked ridges for muscular attachment. In the upper jaw the third molar on both sides was partially erupted; in the lower no trace of these was to be seen, the second molar lying in contact with the coronoid process of the jaw. The teeth (all of the permanent set) were all sound, without evidence of rickety or other malformation, and were proportionately large, as of an adult.

In the vertebral column the centres of ossification were ununited by bone and the epiphyses for the spinous and transverse processes had not appeared at all, these parts being still cartilaginous. The sternum consisted of several plates of bone united by cartilage, as in the child. The clavicles, like the lower jaw, were relatively strongly developed, short, thick and curved with for their size pronounced markings for muscular attachments. The scapulae showed the condition of childhood, the epiphyses being united to the body by cartilage, or in some instances no centre of ossification had appeared in these. The bones of the arm and forearm, though relatively a little shorter and a little thicker than those of a child of seven years, presented in other respects the appearance of that age. Epiphyses and diaphyses were still united by cartilage and not by bone. The same was true of the metacarpal bones and those of the digits, of the thigh and leg and foot. The bones of the carpus and tarsus, however, all present in normal number, suggested adult growth by reason of the sharpness of their moulding. Both patellae were present and of normal development for size and age. In the pelvis the sacrum was markedly inclined forwards. The first sacral vertebra, however, did not take part in the curvature of the sacrum but was, as it were, a continuation of the line of the lumbar vertebrae, the promontory was formed by the second sacral vertebra, which was separated from the first by a cartilaginous disc of 13 mm. in thickness. The ilium, ischium and pubis were ununited to each other, and the pubo-ischial junction, which after the sixth year normally becomes united by bone, was still cartilaginous. All epiphyses were united by cartilage alone.

These two cases, which are alike in all essential particulars, appear to be the first instances of this variety of dwarf growth to be completely investigated from the standpoint of science. Paltauf quotes Schaaffhausen's case as resembling his own and refers, in more or less detail, to other cases, described by various observers, which show dwarf growth associated with delay in processes of ossification, as shown by lack of union of epiphyses and diaphyses in adult years. Amongst these was Bobbie Fenwick, whose skeleton is in the Museum of the Royal College of Surgeons of Edinburgh and is clearly of the same nature as his own case; but one of the others was an instance of cachexia strumipriva (Grundler's case¹); another appears to have been a cretin (His's case²); and a third (Schauta's³) seems very doubtful. Paltauf clearly distinguished between the condition illustrated by his

¹ See Bibl. No. 212.

² See Bibl. No. 128^b.

³ See Bibl. No. 249.

case and such conditions as rickety dwarfism, achondroplasia, etc., and the classical type of cretinism (as regards their skeletal features with which he is mainly concerned); but it is not clear that he knew how to distinguish all types of the thyroid gland group from the condition represented by his case, and, indeed, the thyroid gland group was, apparently, at that time not so fully understood as it has since become. In 1891 A. Schmidt¹ described a case (Theresa Fend) which appears to be certainly of the same kind as those described by Schaaffhausen and Paltauf. In 1896 Manouvrier² described what appears to be another, and in 1899 Joachimsthal³ published details of several more. There are a good many other instances of the same condition in the literature, many of which are shown in the Pedigrees, but the above appear up to the present (by reason of the completeness of their descriptions) to be the most important as enabling us to form a picture of the condition. Thus far cases had been described from time to time; but it was not until 1902 that these were grouped together, and the condition and its relationships were indicated. This was done by Hastings Gilford, and his memoir is no doubt an important contribution to this subject. He examined two skeletons and four living cases, and made one post-mortem examination. It was he who first defined the condition in all its details and gave it a name ("ateleiosis"; Greek ἀτελείωσις, "not arriving at perfection"). He grouped the cases, showed the clinical history of the disease and pointed out the manner in which the condition differs from other varieties of dwarf growth and established the diagnosis. It is owing to his work that the present section of this paper has been written, and I should wish to state this as clearly as possible and express my great indebtedness to this author⁴.

Hastings Gilford (*loc. supra cit.*) discussed four new cases. In the first, which had already been described by Home, but not as ateleiotic, the growth change began during foetal life and the child was greatly undersized at birth—a dwarf infant. The second, a male aged 28 years, was 3 feet 7 inches in height at the time of description. He was of average size at birth but it was observed that he was not growing when he was between one and two years of age; there was no illness or other known cause to account for this. At 23 years of age his height was 3 feet 6 inches, one year later it was $\frac{3}{4}$ inch more; and three years later it had increased to 3 feet 7 $\frac{1}{2}$ inches. One year later his height was still the same. He was of average intelligence, but of the general appearance of a boy of about six years; showing, however, bronzing, wrinkling and other signs of age. Both testicles were undescended, occupying the inguinal canal; he showed infantilism, etc. Ossification, at least of the bones of the hand and forearm, radiograms of which were taken, corresponded to that of a child of about 10 years of age; none of the epiphyses were united to diaphyses by bone. At the age of 23 years all the permanent teeth on both sides of both jaws were present, except the wisdom teeth. The permanent canine teeth, however, appeared to have only just erupted and the temporary canines were still present. Five years later the condition was the same except that the temporary canine teeth had been shed.

¹ See Bibl. No. 270, S. 59.

² See Bibl. No. 324.

³ See Bibl. No. 363.

⁴ See Bibl. No. 408. [Gilford's views are developed more at length in a recent treatise: see Bibl. No. 664. They should be studied in conjunction with the very fine work of the French school on infantilism and true dwarfism. Editor.]

The third case was a female aged 18 years, whose height was 2 feet 9½ inches. She was small at birth but grew at an ordinary rate until she was between two and three years of age. After this she still continued to grow, steadily but at a much diminished rate. She resembled a child in nearly all respects, general appearance, infantilism, etc., but her intelligence was normal for age. Teething began in the eighth month, but it was not known when the permanent set began to appear. The teeth were very irregular and some were of the temporary and some of the permanent set. Radiograms showed that ossification of the hands was a little more advanced than in those of a child of six years.

These two cases of Hastings Gilford clearly represent the same type of case of ateleiosis as is shown by Schaaffhausen's and Paltauf's cases. This group, in which the growth change began in infancy or early childhood, he terms the second, and it appears to be much the largest group of all. Cases show, in adult years, the stature, general proportions and facial appearance of young children. The first group is that formed by cases in which the growth change began in foetal life. This is instanced by the case of (1) Caroline Crachami, the photograph of whose skeleton is shown, Plate AA. She was first described by Sir Everard Home¹, but it was Hastings Gilford who located her amongst the ateleiotics, as an instance of the most extreme type (or Group I) of this condition. This observer regards (2) Frank Flynn, "General Mite" (examined by Virchow and by Ranke and von Voit²), (3) Millie Edwards (Ranke and von Voit), (4) Pauline Muster (Virchow, Bouchard³) as possibly of the same nature. The greatest measurements recorded of these individuals were: (1) At nine years of age, 19½ inches (approximately), a little less than that of a normal child at birth but with head a little bigger. (2) In adult years (exact age uncertain) 32½ inches, weight 14 lbs. 7½ ozs. (3) At 12 years of age 24¼ inches, weight 27 lbs. (4) At five years of age 21¾ inches. These measurements, though very incomplete, suffice to show that the members of this group have on the whole considerably greater defect of growth than those of the second. In the case of (2), Frank Flynn, the only adult of the group, it was said by Virchow that his head was too big for his body but that he was otherwise well proportioned.

Hastings Gilford's third group is composed of cases in which the developmental change first becomes apparent between the ages of infancy or young childhood and puberty. An instance of this is Hastings Gilford's fourth case, in which it was observed by the mother that growth seemed to have stopped (without known cause—he had had no illness and showed no taint) at about the age of 13 years. The height, at the age of 28 years, was 4 feet, 9½ inches, and the weight 79 lbs. "He showed the proportions and appearance of a lad of 14 years, but the skin of his face was more rough and weather-beaten than one ever sees in a youth." The results of a post-mortem examination are recorded. The only essential differences between these and those shown by Schaaffhausen's and Paltauf's cases were (in addition to those stated, *e.g.* appearance of boyhood or adolescence rather than of infancy or early childhood, considerably greater stature, etc.) that ossification and

¹ See Bibl. No. 58.

² See Bibl. Nos. 200 and 216.

³ See Bibl. Nos. 196 and 214.

general development, though delayed, were considerably more advanced (to the normal for 14 years of age, rather than that for seven years, *e.g.*). Again, though there was "infantilism," the right testis was completely descended and the left occupied the inguinal canal, whereas in Schaaffhausen's case there was bilateral cryptorchism. The defects were precisely the same in kind but less marked in degree in all respects. Hastings Gilford suggests that there is possibly a fourth group in which the developmental change first shows itself after puberty; that, if it exists, it will be a less clearly marked group than the third and will tend to become more obscure as age advances and difficult to distinguish from individual variations of growth and development within the normal limits.

These cases demonstrate clearly the features which serve to distinguish the three groups of Hastings Gilford from one another; Group I in which the growth change begins during foetal life and is apparent at birth: Group II in which it becomes apparent in infancy or early childhood, and Group III in which this occurs later but before puberty. They show further that the facial appearance, height and general development, in adult years, correspond, broadly, to those of a child of the particular age at which ateleiosis appeared.

Many examples of these groups are shown in the illustrations (Plates AA—FF, HH), and these, with the cases of Schaaffhausen, Paltauf and Hastings Gilford above described demonstrate the features of ateleiosis sufficiently fully for a picture of the condition to be formed. There are many other cases, either certainly or probably ateleiotic, in the literature. These have been summarised by Hastings Gilford (*loc. supra cit.*) and need no further reference here. Some of these are described in our Pedigrees.

The following short description of the features of the condition seems, however, desirable; and in this the common, second, group alone will be dealt with; for the manner in which examples of the other groups differ from those of this group has been shown.

The facial and general appearances are those of infancy or early childhood¹. The face is short and broad, the head proportionately large, high and quadrate with prominent eminences. The bridge of the nose is somewhat depressed, broad and saddle-shaped, the nose short and undeveloped. The lower jaw and chin are small as in childhood. There is usually no hair about the face; when, however, this is present the growth is thin and weak and the facial appearance apart from this is the same. The neck is short, round and thick, as is seen in the young child. The general bodily proportions are those of normal childhood; that is to say the limbs are a little shorter than in the normal adult so that the midpoint between the

¹ With regard to the facial appearance of this variety of dwarfism, Hastings Gilford (*loc. supra cit.* pp. 345—8) says:—"The facial type is so distinctly childish that it is probable that ateleiotic dwarfs of the second class may be distinguished from all other dwarfs by their physiognomy alone." Probably anyone who has seen many of these cases would agree that a typical case presents no resemblance to any other variety of dwarfism. The face has been described as "cretinoid," but if this is meant to imply that these dwarfs look like cretins it conveys a wrong impression. A glance at the illustrations will show this. The use of the term probably arose from the general similarity in the form of the head in the two conditions (dependent no doubt upon persistence of immaturity in both). There are doubtful cases, in which the distinction is difficult to make; but the face of typical cases of ateleiosis presents no resemblance to that of cretinism, infantile myxoedema or any other form of dwarf growth.

vertex and the soles of the feet is a little above the upper border of the symphysis pubis, whereas in the normal adult it is at that point. The proportionate length of the segments of the limbs to one another is also normal, that is the proximal segment (femur or humerus) is longer than the mesial (tibia or radius). The hands and feet, and the nails of these, have the shape and appearance of those of childhood. There is no deformity of any kind. The larynx is small and undeveloped as in childhood, the voice high-pitched, thin and sometimes squeaky, but with more timbre than that of a child of the same size. The thyroid gland can be felt. The skin though it shows the markings of age (wrinkling, bronzing or weather effects) is not thickened, dry or in any way abnormal, nor are the subcutaneous tissues increased. The hair of the head is also in no way abnormal. There is usually infantilism (cryptorchism, etc.), but this is not invariable, and there are several authentic cases of these dwarfs having produced offspring. The intelligence is normal and of the average for age. It is sometimes stated that these individuals are of shy and diffident disposition and lacking in self-reliance. But this is not invariable nor perhaps more frequent or more marked than is seen in individuals of ordinary growth. When present it seems, very probably, to be the result of the peculiar environment in which these dwarfs spend their lives, and in reflex response to these surroundings. For it appears probable that most people would show evidence of shyness, diffidence, lack of confidence, etc., if they had been objects of curiosity or hilarity all their lives and were only of a stature of, say, 3 feet and of weight, say, 40 pounds. That is to say their mental attributes are probably not infrequently, when present, acquired characteristics and not, properly speaking, part of the disease at all. The musculature, though proportionate to size, is weak and shows the lineaments of childhood. (The skeletons that have been examined also show that the ridges, grooves and points of muscular origin and insertion are very feebly marked, though more pronounced than in the skeleton of a child of the same size.) The physical strength of these dwarfs is necessarily very small though probably, on the average, greater than that of children of the same size; and their endurance is certainly, on the average, considerably greater; for they frequently perform daily and regularly as acrobats, dancers, etc., and this no child of, say, four years of age could do. This greater endurance may, however, be the result of careful training in isolated cases. One case that I have seen had been trained as a "strong man." With a total body weight of 40 pounds he could support some 250 to 300 pounds by "making a bridge." He was very muscular (the outlines of the muscles were, however, even in this case, those of childhood and not of adult age. His age was 24 years). Paltauf's case (Mikolajek) is also stated to have been very muscular, and Hastings Gilford (*loc. supra cit.*) quotes another case of a "strong man" who was very muscular. This is certainly very unusual and probably the effect of occupation or of special training when it occurs.

Dentition. In all the few cases, some eight in number, that I have been able to examine on this point, dentition appeared to be normal, as it frequently is in ateleiosis. But in the above eight no reliable history as to the time of eruption of either milk or permanent set could be obtained. In three of these cases, each of about 60 years, all

the permanent set were present, none were carious and they appeared little worn. Hastings Gilford considers that the explanation of this occurrence (which is at least unusual in full-grown individuals of this age, but which has been noted as frequent in ateleiosis) is to be found in the fact that they have appeared late, and this explanation was suggested in Paltauf's case. "The teeth are, as a rule, decidedly backward in development, though they are of ordinary size" (Hastings Gilford). In Schaaffhausen's case the permanent dentition was delayed and irregular but the teeth were of ordinary size. In Paltauf's case none of the third molars were completely erupted but the teeth were all sound and of ordinary size. In the case of "Tom Thumb" (quoted by Hastings Gilford) "there was a double row of teeth all round." In that of Bobbie Fenwick "dentition was very irregular owing to the late appearance of several of the teeth." In Hastings Gilford's own second case, quoted above, "the milk teeth persisted side by side with those of the permanent set."

Naked-eye Appearances and Characters of the Skeleton. These, at the present day, are perhaps the most important points for study if we wish to attain any knowledge of the essential nature of the condition, or at least as showing how markedly it differs from achondroplasia, rickety dwarf growth, etc. But these features are more easily and advantageously studied in the actual accounts of cases given by Schaaffhausen, Paltauf and Hastings Gilford, quoted above, than in a general description of the osteology; in order to emphasise the importance of this aspect of the subject those cases were quoted at the beginning of this paper and quoted fairly fully.

Microscopical Appearances of the Skeleton. Paltauf's description of the microscopical appearances (*Ueber den Zwergwuchs*, S. 46—52) is as follows: "For microscopical examination plates were sawn out of the fresh bone to include the epiphyseal line and the parts on either side of this; these were decalcified and imbedded and sections were then cut. Sections from the following bones were examined: Humerus, head of femur, lower epiphysis and great trochanter of femur, tibia. Stains: Haematoxylin, Eosin and Carmine. Examining with the naked eye a section, coloured by the first two stains, from the epiphysis of the femur for example, a double coloration of the epiphyseal line is to be seen. This line is represented for the most part by a band staining red, but this is accompanied by a very fine bluish border which is not equally broad throughout, is finely indented and finally, in some specimens, breaks through the red band here and there. Under the microscope there is on the whole a similar division of the staining of the preparation but naturally in addition many other appearances are seen.

"The cartilage of the epiphyseal line, followed from the outer end of it, that is, corresponding to the surface of the bone, presents most externally a layer of loose wavy connective tissue, which soon becomes denser, firmer and fibrillar. These two connective tissue layers are continued from the part of the preparation belonging to the diaphysis and are continued further over the zone, which represents the cartilage of junction, to end finally on the articular cartilage of the joint, and this, finally, marks the contour of the section. The dense-fibred connective tissue covering becomes looser in texture where it covers the diaphysis, becomes richer in cells and

more vascular, becomes in short the periosteum of the cortical layer of the immediately underlying bone-shaft. Just at the level of the zone in which the epiphyseal cartilage becomes marked off there appear in the fibrous tissue elongated spindle-shaped cells parallel to the long axis of the bones, at first single, then in groups, each with an elongated granular nucleus and clearly defined outline. The further inwards one follows, the larger do these cells become and the larger do their nuclei become; the cell as a whole appears to lie in a cavity. The surrounding intercellular tissue has at the same time lost its fibrillar character and has assumed that of a perfectly hyaline intercellular tissue staining diffusely bluish red. Still further towards the axis of the bone, where the epiphyseal cartilage begins to show itself in the preparation as free trabeculae between the substance of the bone marrow of the epiphysis and diaphysis, the above cells are still more numerous and lie in twos, threes and fours; they are larger, spherical, possess an obvious cell membrane and lie in cavities in the intercellular substance. Where several cells lie together they are flattened at their points of contact and form small groups or almost rows of oval cells, the long axes of which are transverse or at least somewhat oblique to the inner border of the cartilage. The intercellular substance here shows, with clearly marked cell-systems, a homogeneous area around the cell itself, but otherwise a fine fibred or reticular or granular appearance. An intense blue clearly defined staining of the intercellular substance, which can be traced back to the decalcification of the cartilage bordering on the bone marrow, suddenly appears. This blue margin is thin, often interrupted and contains collections of cartilage cells clearly recognisable as such, which in some cases are hyaline and glistening and in others nucleated and stained blue; these cells contain, in addition to the relatively large, in part oval and in part serrated nuclei, small particles which very deeply absorb the stains. The cartilage cells are, in this situation, not more densely crowded, but are of greater size than in the regions hitherto described.

“Following the section further it is seen that the substance of the investing cartilage is continued without interruption into that of the epiphyseal cartilage and that both are of similar microscopical structure. The histological nature of the cartilage of the epiphyseal line (or line of conjugation) is not, however, uniform, but shows different features at different parts of the disc, or of the section. The intercellular substance of the cartilage is, on the whole, of hyaline character; but this hyaline material is in numerous places displaced by a fibrillar or granular structure. The fibrillation of the cartilaginous matrix is in places very faint, in others clearly shown. The fibrils are not always regular in arrangement but in places wavy or reticular; in other places the fibrillation is coarser and changes the whole appearance of the matrix. The least marked deviation from the purely hyaline condition of the matrix is to be seen in a very fine granulation of this. It is only around the groups of cells and in the middle of the cartilage of the epiphyseal line as a whole that the cartilaginous matrix has a hyaline structure. The epiphyseal side of the cartilage discs shows the changes in the ground substance that have been indicated, in slighter degree, but especially there is in rare places a fibrillation with direction at right angles to the long axis of the cartilage. The side facing the diaphysis shows, on the contrary, a much more mixed

and more changeable form of structure of the ground substance, the hyaline cartilage is here solely confined to the neighbourhood of the cells and cell groups that here occur, it forms concentric areas of small thickness around these and these are isolated from one another by a matrix or ground substance which may be granular, fine, striated or fibrous and is in places so coarse-fibred that it has much the characters of fibrillar connective tissue. The fibres are for the most part directed in the long axis, but are throughout accompanied by oblique and transverse fibres, so that an irregular field is produced in which the cartilage cells are scattered. These transverse fibres appear in the centre of epiphyseal cartilage but are there faintly indicated; towards the bony margin they become more numerous and coarser, to form, here, coarse fibrillar arrangements between which cartilage cells are enclosed. These fibres pass, at the border of the layer of calcified cartilage, directly into the ground substance of it.

"The cartilage of the epiphyseal line is throughout studded with cells and cell groups, which according to the region under examination show numerous differences in size, form and arrangement. In the middle region of this cartilage of the epiphyseal line the cells much resemble those of the cartilage covering already described; elongated, spindle-shaped cells with granular nuclei which for the most part lie in groups and which become the bigger the nearer they approach the surface of the cartilage, and also undergo such an obvious change of form that one can here recognise in them the typical form of cartilage cells: globular, glistening cells with somewhat distorted nuclei and obvious, clearly defined cell borders; the cells lie in places singly, in places in oval groups or rows, in common cavities with hyaline or granular blue stained cell substance and with large nuclei. On the side of the cartilage of the epiphyseal line which faces the epiphysis the above cell-formation only occurs rarely and is not well shown. On the opposite, diaphyseal, side there are more groups, and these contain more cells. Amongst the well-formed cartilage cells there are also some to be found which are scarcely of this nature, since they are elongated, spindle-shaped, indentated and show processes. For the most part, also, they lie several in a group, and this circumstance, as well as the fact that they lie free in the cartilage matrix, indicates that they only represent altered cartilage cells, and this is also shown by the peculiarity that cell groups of this kind, when they lie at the margin of the layer of calcified cartilage, show portions which are without doubt those of cartilage cells.

"From these malformed cells all transition stages to such as can be regarded as normal and still capable of function can be seen. Cells of the latter kind are very numerous towards the diaphyseal side of the cartilage of junction, and form here groups and columns which can scarcely be distinguished from the columns of cartilage cells which distinguish the layer of proliferation of cartilage cells in the epiphyseal cartilage of the growing child.

"The ends of the cartilaginous part of the epiphyseal junctions are invested in their whole extent by a border of calcified cartilage, which has already been described. The marking off of the two otherwise regular layers is extraordinarily sharp, and they can very easily be separated from one another, of which one has evidence only too

frequently in the preparation of the microscopic section. The calcified cartilage on either side of the cartilage of the epiphyseal line shows the same qualitative relations; the only differences are that whereas this border on the side of the epiphysis is thin, often interrupted and especially poor in cell elements, is indeed almost lacking in columns of cells, that facing the diaphysis is very rich in cells, much broader and rich in columns of cartilage cells, and these sometimes consist of twenty or more cartilage cells regularly arranged. (In this way, also, the thickness of the layer is indicated.)

"I should like here to state that this calcification of cartilage is not in the least to be confused with that impregnation with calcareous salts in which, during the process of ossification, the precursor of cartilage transformation is to be seen, but that it is much more to be compared to the calcification which is well known as an age-change of cartilage (which occurs in the costal cartilages, *e.g.* in aged persons); what has already been said will suffice to prevent such a mistake arising; but there are other indications of this.

"The side of the border of calcified cartilage which lies next the bone is serrated or indented; it shows lacunae and crypts, possesses the contour that we know in normal processes of ossification, but from which the condition of the underlying cartilage clearly distinguishes it, so that neither marrow nor cartilage cells but only a proliferative change can be recognised. The cartilage is covered over with osteoid and real bone tissue, the marrow spaces—of primary marrow spaces one cannot speak—are filled with marrow substance like any part of the bone. The bone lamellae of the marrow (trabeculae) are thin, delicate, show many lacunae between them, and enclose, for a distance of 1 cm. or thereabouts, from the cartilage of the epiphyseal line, calcified cartilaginous rests with or without cells.

"At the site where the cartilage of the epiphyseal line becomes attached to the bony cortex the margin of calcified cartilage is continued along the cortex of the diaphysis for a short distance.

"The picture of the histological appearances of the cartilage of the epiphyseal line here described holds in general for all the bones examined, so that in order to describe the condition shortly, but as far as possible completely, I may confine myself thereto, merely showing further peculiarities of this or that region.

"Thus the cartilage of the epiphyseal line of the lower epiphysis of the femur shows a thickness greater than any other, as great as 3 mm., and a markedly zigzag form. The whole epiphyseal cartilage lacks the small cells almost entirely, containing throughout large cartilage cells which, on the diaphyseal side of the cartilage of the epiphyseal line, are in such numbers and are arranged in such clearly defined columns, that one might suppose the section to be one of an epiphysis of a normal child, if it were not that in this case, more prominently than in all other preparations, the calcification occurs and occupies here half the breadth of the entire cartilage of the epiphyseal line. This is, in the same way as in the other dwarf specimens, bridge-like and completely transverse; and these appearances show themselves with the same regularity as in the other preparations. The striated appearance of the intercellular

substance is here more marked; the bundles of fibrils form columns and arches along and over the columns of cartilage cells and the immediately surrounding matrix, and form a system, somewhat resembling that of the lamellae of the bone marrow, and possibly like it, of some mechanical importance." (The epiphysis of the great trochanter, and of the tibia, showed minor differences from the above, which need not be detailed here.)

"The following comparison between the appearances shown at the epiphysis of an ateleiotic dwarf and that of a child of normal growth of the same size is important.

"The cartilage disc is, absolutely, broader in the child than in the dwarf. The general arrangement of the cartilage, with its intercellular substance and cells, is the same in both; the region of union is, however, different in that that of the child is much more cellular. The matrix shows a slight fibrillation between those cell columns which are nearest to breaking down, a process of disintegration which also occurs in the dwarf. In the case of the child, however, the cells show an appearance suggestive of active life and growth. The contrasts with reference to the epiphyseal and diaphyseal sides of the cartilage of the epiphyseal line are of a similar kind to the above in the child; but diffuse impregnation with calcareous salts occurs in the case of the dwarf. The cartilage cells arranged in typical manner in rows, according to their different degrees of development in the changes of bone formation with, as the last steps of that preparatory change, swelling, calcification, and finally invasion by marrow capillaries and erosion or solution; this is the condition in the normal child.

"A comparison of preparations from the dwarf and from children shows that the zone of calcified cartilage, in part occupied by columns of cells and in part disintegrating, corresponds to that layer of a bone undergoing normal ossification which directly adjoins the margin of the cartilage; but that it is distinguished from the normally developed in this: that in the case of the latter the cartilaginous remnants are inferior in quantity to the already formed bone substance, so that between the trabeculae thin serrated calcified cartilaginous remnants can be discovered; while in the case of the former, the dwarf, these calcified cartilaginous remnants have been preserved to a striking extent. While normal ossification at once lays down real bone substance on the remnants of cartilaginous matrix which for the time are stationary, in the case of the dwarf we find a thin interrupted layer of osteoid tissue on which afterwards real fibrillar bone forms itself.

"A further marked difference between the histological conditions shown by the epiphysis of the dwarf and that of the child is that in the latter the advancing development of the cartilage cells can be followed step by step, while in the case of the dwarf there is seen, amongst the small-celled middle layer of the cartilage, large spherical cartilage cells or only larger rounded cells, mostly in groups; there are thus, in the cartilage of the epiphyseal line of the dwarf, cells belonging to different stages of development mingled together, while in the case of the normal child of the same size, in the normal processes of cartilaginous development, a definite train of changes

in developing cells can be followed until the last stage of transformation to bone is reached. Cartilaginous inclusions in the bony trabeculae of the spongiosa occur in both cases, as the continuation of the last layer of the cartilage of junction with the first layer of the diaphysis; the description given above applies also to the cells found here."

Essential Nature of the Condition; its Aetiology, etc. As concerns causation nothing certain is at present known; but in a considerable proportion of cases evidence of the "hereditary" or "family" influence is forthcoming, as a reference to the pedigrees recorded below will show. All known causes of secondary dwarf growth and the causes or associations of other conditions of "infantilism" discussed on page 368 can be excluded. As we have stated, however, "infantilism," though usual, is not invariably present in ateleiosis: see p. 394).

The following views as to the nature of the condition have been held:—

I. The defect of development is "germinal." That is to say the developing ovum possesses an inherent general, but possibly minor, defect, so that, although at birth and, for a time subsequently, growth and development appear perfect, yet the constructive anabolism of the organism does not continue to prevail over katabolism during post-natal growth and development; so that, after a period, and without adverse influence of any kind, growth and general development become quiescent and cease to continue through puberty and adolescence until adult years, as they normally do. The average normal development of adult years is thus never attained. Normal development may be supposed to depend upon three motive forces:—(1) architectural or plastic, determining the growth in form of individual parts; (2) that which determines growth of these in size; (3) that which determines the continued growth of the organism as a whole. In this view defect of (1) or (2) will produce deformity; defect of (3) will produce dwarfism.

In the above view ateleiotic dwarfs are children or infants that have never grown up. This in itself constitutes an abnormality, but the view seems to presuppose that growth and development, as far as they go, are normal but have stopped short before their time. This, however, is disproved by the following facts, which show that the condition is an abnormality of development in a still further sense; for while some parts have ceased to develop, others have continued to do so:—(a) these dwarfs are in adult years, intellectually, not children but adults; (b) they do not always show "infantilism"; (c) in cases where they do show this, with *e.g.* cryptorchism or incomplete descent of testes, this condition corresponds to a pre-natal stage of development, whereas other features correspond to those of a later age. For instance, in Paltauf's case the right testis was in the inguinal canal, the left was completely descended. Development thus corresponded, in this respect, to that of a foetus of about eight months (but was still further abnormal in the fact that the right testis normally descends about one month before the left), while the general features of development were those of a child of seven years. Schaaffhausen's and Hastings Gilford's cases already quoted also illustrate this point. (d) As regards growth, particularly that of the bones of the skull, to take Paltauf's case, while those of the

base showed measurements less than those of a child of the same size, those of the vault showed in some cases measurements such as are found in adults, which indicates that growth was irregular and abnormal; (e) the frequent irregularity of dentition suggests abnormality; the usual final appearance of all the permanent set except the third molars shows, in this respect at least, a continuation of development past that of childhood; (f) the microscopical appearances of the bones at the epiphysial lines, etc., are not those shown by the normal child of corresponding size, but are abnormal. Again, the ridges and grooves for muscular attachment on the bones are more marked than on those of a child of the same size. The development of some parts is thus more advanced than that of others.

Since, therefore, some parts show the development of adult age, some that of childhood, others that of foetal life, while the microscopical appearances of the line of ossification suggest abnormality, the condition cannot be regarded simply as one of retarded development, but must be supposed to be one of abnormal development, retarded as a whole though it be.

II. The condition is essentially one of defective bone growth and development. It is a bony "dystrophy" or "dysplasia"; that is to say it is, strictly speaking, a local condition. This view cannot be definitely refuted at present for lack of full knowledge. It appears, however, improbable, and the evidence for it is not apparent.

III. The skeletal peculiarities are primary, the others secondary to this condition. In this view there is some primary disease of bone which exercises a deleterious influence upon development as a whole. Against this view are: (1) The fact that none of the changes seen in the bones are pathological. The bone marrow and the cortex of the shafts are normal. The changes seen about the epiphyses and beneath the periosteum of the shaft are the same in kind as those which occur in childhood (seen, however, in these cases in individuals of adult years and with minor differences in the direction of defect), or as the calcification of cartilage that normally occurs in the aged (occurring here, however, in cartilage which has persisted abnormally unossified). None of the changes are pathological. (2) The fact that some features, *e.g.* cryptorchism, are present at birth, but no evidence of bone defect occurs until later.

The above views can probably all be dismissed as fallacious. One can only suspect that the features, one and all, of this condition are secondary effects. The primary cause might be supposed to be (IV) a bacterial infection. For this there is no evidence, and none of the features of the condition suggest it.

V. A maternal intoxication, placental or other. If this occurs its action must be, usually, delayed for years. Nothing is known upon this point, and there is no recorded evidence of placental abnormality in these cases. Occasionally ateleiosis is present at birth, and this, together with the fact that the condition fairly frequently occurs in more than one member of the same generation, is the only feature suggestive of this view. But cases in which ateleiosis occurs in father and son (as in two instances in the pedigrees) cannot be explained in this way. The view is entirely fanciful.

VI. Some intoxication from without or an auto-intoxication other than such as is due to abnormality or defect of some internal organ. Nothing is known of any such influence.

VII. All the features of the condition are produced by defect or abnormality, of one or another kind, of some internal organ. Analogies drawn from conditions of dwarf growth such as cretinism and such conditions as show "infantilism" produced by such defects suggest plausibility for this view. That ateleiosis is secondary to abnormality or defect of one of the viscera seems the most probable explanation of it at the present day. It appears possible to exclude, however, the pancreas, intestine, spleen, suprarenal body, kidney, thymus, and most other causes, enumerated under the heading "Infantilism." These produce infantilism and defect of growth, but not ateleiosis. Defects of thyroid gland in infancy produce cretinism and infantile myxoedema, conditions which in some of the gross features resemble ateleiosis; and occasionally cases occur in which the diagnosis between infantile myxoedema and ateleiosis cannot at once be made. This is, however, very exceptional and as a rule no such resemblance exists; and although in Paltauf's case it is stated that "the thyroid gland was small and pale red," this cannot be held to imply that it was in any way deficient in action. The case showed no evidence suggestive of this. It is the only undoubted ateleiotic case at all fully described in which the thyroid gland could be under suspicion. There remain the testis (or ovary) and the pituitary body or hypophysis cerebri. With regard to the generative organs the fact that "infantilism" with (in the male) cryptorchism so frequently occurs in ateleiosis seems suggestive, because cryptorchism is the first indication of any abnormality; it is present at birth while other defects are only observed later. But that this, the first apparent defect, is a cause rather than one of the effects of some other obscure cause seems improbable. The effect upon growth and development of removal or defect in early life of the sexual glands is not clearly known. "Infantilism" is produced; but that dwarfing of growth and development in other directions always follows does not appear to be the case. Nor are the skeletal features apparently like those of ateleiosis. (The beneficial effect of ovariectomy in mollities ossium or osteo-malacia does not appear, for obvious reasons, to have any bearing here.) Paltauf discusses this question at some length, but without bringing its answer any nearer. On general grounds it seems fair to suppose that the defective development of the sexual system that is usually present in ateleiosis is, as in cretinism, one of the general effects rather than a cause in itself.

There remains, as the possible primary cause of ateleiosis, abnormality or defect of the pituitary body or hypophysis cerebri; and this, at the present time, seems on the whole the most probable. On the one hand the condition seems to represent the opposite pole of abnormality as regards *growth* to that shown by pituitary gigantism, such as that shown by the skeleton of O'Brien in the Museum of the Royal College of Surgeons of England, while in other features, such as "infantilism," defect or delay of union of epiphyses, persistence of growth after normal growing

years, asthenia, somnolence, etc., the two conditions appear to show similarity. On the other hand, in Paltauf's case it is clearly stated that the cavity of the sella turcica was much enlarged, and that the pituitary fossa showed measurements which were, in all directions, greater than those of the mean of several adult skulls of average size, whereas the rest of the sphenoid bone showed measurements which were less than those of the skull of a child of seven years (of a child of a height, that is, equal to that of Paltauf's dwarf). It is to be supposed, therefore, that in this case the pituitary body was considerably enlarged; but there is no note of the pituitary itself having been examined. This the only definite evidence that there is upon this aspect of the subject. The number of autopsies made has been very small, and in none of them except the above instance was this point investigated. In Hasting Gilford's autopsy the pituitary fossa appeared normal, but the hypophysis cerebri was not examined. So that the view that ateleiosis is due to abnormality or defect of the pituitary gland must at present remain hypothetical; but it appears probable at the present day.

As regards growth and development as a whole it seems clear that neither is absolutely stopped but both are indefinitely retarded or reduced to a minimum. Hastings Gilford (*loc. supra cit.*) quotes several cases in which growth, having apparently ceased, began again and slowly continued, although at a much diminished rate, until late in life. Ateleiotic dwarfs appear to be capable of growth until quite late in life—up to 30 years or over. (See Jeffrey Hudson (p. 360), Joachims-thal's cases (Bibl. No. 363), etc.)

Abnormalities found in Association with Ateleiosis. It has been stated that what would appear to be causes of dwarfism and of "infantilism," as discussed on pages 364 to 365, can in all cases be excluded in ateleiosis. There are, however, some cases recorded (doubtful, it is true) in which what may possibly have been ateleiosis was associated with some other condition, possibly without any relationship of cause and effect.

(1) Paltauf (*Ueber den Zwergwuchs*, S. 41) quotes a case (Helm Gottfried), which possibly showed ateleiosis with osteo-malacia. This may have been an independent association of two conditions; but it appears much more probably to have been one of dwarf growth and "infantilism" secondary to osteo-malacia with onset early in life, *i.e.* in childhood. (2) Paltauf (*loc. supra cit.* S. 37 and S. 38) quotes a case (König's) which was probably one of ateleiosis. Death occurred at the age of 18 years from cerebral tumour (cysticercus cerebri). There were osteo-chondromata on ilia, ischia and pubes. (3) Sir Jonathan Hutchinson¹ has described a case of what appears to be ateleiosis which showed marked hypertrophy of the gums, of unknown cause. (4) Hastings Gilford (*loc. supra cit.* pp. 358 and 359) quotes Thomson's case, which showed hypertrophy of the thymus gland. This may possibly have indicated a condition of "lymphatism"; but, whether or no, the case appears just as likely to have been one of dwarf growth, with "infantilism" secondary

¹ Hutchinson, Sir Jonathan, "A case of hypertrophy of the Gums with General Dwarfism." *Edin. Med. Journal*, n. s. vol. 1. No. 2, p. 117.

to the thymic hypertrophy, as one of ateleiosis with the former as an independent association. (5) Hastings Gilford's third new case (Martin Lane) "showed a persistent, though not patent, ductus arteriosus." (6) Bobbie Fenwick above referred to shows some abnormality of the development of the lower jaw of uncertain nature. These appear to be all the cases that have been recorded which illustrate this matter. Of these cases (1) and (4) are probably not ateleiotic and (3) is doubtful. It is, in cases like (1) and (4), difficult to exclude some secondary form of dwarfism with "infantilism."

The above cases show nothing of any special significance. Ateleiotic dwarfs appear to be subject to the same diseases and to show the same age changes and causes of death as do individuals of normal growth.

Duration of Life in Ateleiosis. Sternberg (*loc. supra cit.*) states that dwarfs die, on the average, younger than do ordinary individuals. This does not appear to be true on the average of the ateleiotic variety. Boruwlaski lived to be 98 years of age, Jeffrey Hudson to 62, others, *e.g.* the Gibsons, to over the seventh decade and one, probably ateleiotic, to 100 years (see general account). I know of three cases of 60 years or over, all in apparent health, and of three over 50 years of age in the same condition. The span of life does not appear to be really altered, on the average, by ateleiosis.

Diagnosis. Differentiation from other varieties of dwarf growth and from the various other conditions associated with "infantilism" (and usually, also, showing dwarfing of growth) has been considered in the general discussion—pp. 393 *et seq.* Diagnosis can only be made, of course, upon general principles. In typical cases it presents no difficulties. The most important indications of ateleiosis appear to be: (1) Very low stature. In the commoner group of cases, at least, the degree of dwarfing is only equalled by that of extreme grades of cretinism and infantile myxoedema. (In the less common third group it is of course not very marked.) (2) Proportions, those of childhood, normal, with the exception of the cranium, which is relatively large. (3) Absence of deformities of any kind. (4) Facial appearance child-like or infant-like, without any of the symptoms such as macro-cheilia, macro-glossia and increase of subcutaneous tissues found in cretinism and infantile myxoedema. (5) Intelligence normal. (6) No cause (such as those enumerated in the general discussion) apparent. (7) Radiographic examination of the skeleton, showing delayed union of epiphyses, their delayed appearance or their absence.

In certain cases, however, the distinction between ateleiosis and infantile myxoedema is nearly impossible to make, at least in the earlier years; for, on the one hand, cases of ateleiosis do occasionally show mental backwardness almost amounting to idiotcy, and on the other hand, in cases of infantile myxoedema mental backwardness may not amount to idiotcy and symptoms other than dwarfing of growth may be very slightly marked. Nor does the influence exerted by the administration of thyroid extract always remove the difficulty, because, as is well known, thyroid extract sometimes appears to act beneficially on other varieties of dwarf growth, such as do not appear to have any relationship to thyroid gland defect. Such

symptoms as "infantilism," "cryptorchism," etc., are shown by both conditions and even the radiographic appearances of the skeleton may be indecisive in earlier life in distinguishing the one condition from the other. From such conditions as achondroplasia, rickety dwarf growth, mongolism, etc., the diagnosis can be made at a glance; these conditions present no real resemblances to one another, except defect of growth or development as a whole.

Heredity. As is shown by the pedigrees, ateleiosis has been known to occur, fairly frequently, in several members of a family in the same generation. Schmolck's case, see Pedigrees, Fig. 689, shows the condition in two branches of such a family. With few exceptions families described with the pedigrees show the condition in only one generation. In one of these exceptions (Pedigrees, Figs. 608 and 620) an achondroplastic mother produced an ateleiotic son by an ateleiotic father. The latter did not show "infantilism," the son, however, does (see Plates DD (51) and FF (62)). In a second case, that of Levy, Pedigrees, Fig. 708, ateleiosis occurred in father and son. The grandfather was also probably ateleiotic.

The ateleiotic individual usually shows "infantilism" and is usually sterile, but this is by no means invariable. There are a fair number of cases recorded in which offspring have been borne to parents one or both of whom were ateleiotic. These, however, with the exception of the cases quoted have grown to a normal size if they survived to adult years. The history of the descendants or collaterals in the latter instance, if any, does not appear to have been followed up and recorded; so that nothing is known of that aspect of the heredity of this condition.

Dangers in Delivery. Comparing these dwarfs with achondroplastic individuals, in whom the process of child-birth is always one of vital danger, the question arises whether in them also dangers arise in delivery. This seems to be unusual, but sometimes to occur. The comparative structure of the two classes of dwarfs shows why this is so. The achondroplastic female is one who, though she possesses a trunk and cranium of practically normal dimensions, owes her lack of stature to the fact that the bones of her limbs are defective in growth. This defect is more marked in those of the segments nearer to the trunk than in those more remote; affecting most those in which ossification in cartilage begins early *in utero*. That is to say long bones in which ossification becomes relatively advanced during life, *in utero* are the most defective, and to this group the bones of the arm and thigh belong. The bones of the limb girdles, though affected to a less degree than these, are relatively defective. A pelvis which is small in comparison with the rest of the trunk and the head results. On the other hand these individuals have normal powers of reproduction. An achondroplastic female may have a child of normal proportions, or one like herself; in either case the cranium is of at least average dimensions; her pelvic inlet and outlet are, however, too small to permit of the passage of a child at anything approaching full term; hence normal labour is here impossible. The ateleiotic dwarfs on the contrary are puny individuals. Their bodily development with the exception of the cranium is defective as a whole; they have small bodies as well as small limbs, and though the pelvis is contracted, it is not

contracted proportionally to the rest of the skeleton. It maintains the relative size and shape present in the young child of normal growth. Further, their powers of nutrition are probably not great enough to maintain, nor is their abdominal capacity great enough to contain, as a rule, a child which would be full sized at full term. Their infants are therefore usually undersized at birth in due proportion to their own size. Hence as a rule no trouble in delivery occurs. It appears that in some cases, however, the child is of normal size and the head occupies the true pelvis in the later months of pregnancy. In other cases the child, full sized at birth occupied a normal position in the abdomen and delivery by Caesarian section or embryotomy has been necessitated. (See accounts of such cases with the pedigrees.)

Frequency. Ateleiosis appears to be a rather rare condition, but no exact estimate of its frequency seems possible at present. "Johann Ranke found amongst 45,000 Bavarian conscripts, who were mustered for military duty in the year 1875, 43 dwarfed individuals, or a percentage of 0.095, whose height varied from 1.40 m. (4 feet 7 inches) to 1.15 m. (3 feet 9 inches), and were for this defect rejected as unfit for service. The average height for males in Bavaria is 1.62 m. (5 feet 3¾ inches)" (A. Schmidt¹).

It is possible that some of Ranke's cases may have been examples of ateleiosis; but if so we do not know how many; and such conditions as rickety dwarfism (so much more common), achondroplasia, etc., would probably account for the majority of cases that were due to disease. In a military muster of conscripts under compulsory service, which appears to be "no respecter of persons," even some mentally deficient cases, such as examples of cretinism, infantile myxoedema, etc., would possibly be required, unless obviously idiotic, to attend among the number for inspection, before being rejected as unfit. So that the above figures do not afford any means at all of estimating, even approximately, the frequency of ateleiosis.

In the recent exhibition of some 53 "dwarfs" at Olympia, London, October 1909 to January 1910 the ateleiotic dwarfs appear to have been in a majority: see Plate FF (60). The names and ages of these "dwarfs" are appended².

It was reported that 200 more "dwarfs" in various parts of Europe were known

¹ See Bibl. No. 270.

² NAME.	AGE.	NAME.	AGE.	NAME.	AGE.
Diedrich Ulpts ...	49	†Angelica Dorflier ...	17	Karl Liebisch ...	18
Meyer Blaser	40	Reinhold Tschuschke	36	Alois Sauer ...	16
Sally Gabriel	27	Helene Tschuschke (Kulawy)	40	Thomas Thon Jones	16
†Albert Huebler	45	Heinrich Glauer	24	Josef Weisseneder	14
Andreas Wruck	23	Bruno Glauer ...	20	Louise Leynard	29
Gustav Geschke	52	Paul Hennersdorf	28	Andreas Leynard	26
†Don Ward ...	28	Adolph Pospiech	30	Christian Hansen	31
Otto Beskow ...	20	Liesbeth Botschen	15	Juvenal Dhelin	19
Otto Botcher ...	21	Franz Jungling	56	Auguste Geoffroy	37
Baron Ernesto Magri	62	†Lilly Warton ..	25	Smaun Sing Hpo	26
Count Primo Magri	59	Anna Mayor ...	32	Wilhelm Moller	56
The Countess Mercy Lavinia		Anna Angerer	24	Charlotte Moller (Braker)	45
Magri ("Mrs Tom Thumb	67	Paula Angerer ...	22	Martha Schwarz	22
Annie Nelson Laible	45	Hlonka Blaschek	24	Marie Meister ...	16
George Laible ...	48	Isabella Otocka	18	Agnes Jankowska	23
†Dagmar Huther (Kipke)	43	Ignar Haun ...	27	Wizentina Jankowska	49
†Ludwig Merz ...	18	Albert Grunner	23	Karl Hesselbart	37
†Elizabeth Dorflier (Kipke)	41	Arthur Huhle ...	21	Johanna Freyer	25

† Signifies achondroplasia.

to the promoters of this exhibition, but here again, examples of such conditions as cretinism, etc., would probably be included. Ateleiosis is, however, probably more common than is recognised; the fact that so large a number of "exhibition" cases exists tends to confirm this. It must be remembered that a considerable proportion of cases do not join "exhibitions," and so remain little noticed. These would usually only come under the observation of medical men for complaints other than ateleiosis and so would in some instances possibly escape record as cases of ateleiosis. If these suppositions be correct the condition is probably more common than would be, at first, supposed.

The condition occurs in the lower animals, at least in the equine species (see Plate FF (61)).

BIBLIOGRAPHY OF DWARFISM.

By A. BARRINGTON, Eugenics Laboratory.

BIBLIOGRAPHY. This bibliography applies in the first place to true dwarfism and achondroplasia. The references to myxoedematous dwarfs and to cretinism are only intended for the purpose of comparative citation or illustration. Cretinism and Infantilism will be treated at length in other sections of the *Treasury*. It was intended at first to divide the Bibliography into two sections, (i) True Dwarfism (Ateleiosis) and (ii) Achondroplasia, but it was found that (a) many of the works dealt with both groups and (b) in most of the earlier records of historical dwarfs it was not possible to be absolutely certain of the class to which the dwarf really belonged.

An asterisk attached to the index number denotes that the bibliographer has not been able either to discover or to consult the paper referred to.

1. CARDANUS, JACOBUS: *De Subtilitate*, p. 357. Basiliae, 1554. [He states that, in the previous year, a man of adult age and a cubit in height had been carried round in a parrot's cage.]
2. THURNEISSER ZUM THURN, LEONHART: *Pison, Das erste Theil. Von kalten, warmen, mineralischen und metallischen Wassern, sampt der Vergleichung der Plantarum und Erdgeweachsen*. Buch 7. Cap. 84, S. 358—359. Franckfurt an der Oder, 1572. [He states that he was told that pygmy bones and an entire pygmy skeleton, which was only "2 Werkschuh, 3 Zoll lang," had been dug up near the town of Lubin.]
3. GUYON, L.: *Les diverses Leçons*, T. I. Chap. vi. pp. 789—795. Lyon, 1604. [Several dwarfs are mentioned, among them one in Cairo in 1559, an Abyssinian aged 68, not above "3 pieds" in height, who said his father was smaller than he "d'un demy pied."]
4. TALENTONI, GIOVANNI: *Variarum et reconditarum rerum Thesaurus*. Liber III. Cap. xxi. pp. 543—553. Francofurti, 1605. [This chapter is on the pygmies of the ancients. He quotes many classical writers.]
5. PURCHAS, S.: "The strange adventures of Andrew Battoll of Leigh in Essex sent by the Portugals prisoner to Angola, who lived there and in the adjoining regions neere eightene years." *Purchas, His Pilgrimes*, Vol. II. Chap. III. pp. 981—983. London, 1625. [He tells of a pygmy race called Matimbos, who lived to the North-East of Mani Kesock. He says, "they are no bigger than Boyes of twelve years old, but are very thicke and live onely upon flesh, which they kill in the Woods with their Bowes and Darts."]
6. BARTHOLINUS, CASPARUS: *Opuscula Quatuor Singularia*. I. De Unicornu ejusque affinibus et succedaneis. II. De Lapide Nephritico et Amuletis praecipuis. III. De Pygmaeis. IV. Consilium de Studio Medico inchoando, continuando et absolvendo. Hafniae, 1628. [De Pygmaeis consists of eight chapters on dwarfs and on the pygmies of the classical writers. pp. 3—5 give a long list of celebrated men who were small of stature.]
7. PLATERUS, FELIX: *Observationum in hominis affectibus plerisque, corpori et animo, functionum laesione, dolore, aliaque molestia et vitii infensus Libri Tres*. Liber III. pp. 581—582. Basiliae, 1641. [An account of three dwarfs is given: (i) Johann d'Estrix, a native of Mechlin, who was with the Duke of Parma. He was seen in Basel in Nov. 1592, aged 35 years, height "tres pedes." He had a full beard, could speak three languages, and was ingenious and industrious. (ii) John Ducher, an English dwarf, seen in 1610. Judging from his wrinkled face and

long beard he was aged about 45. "Longus erat pedes duos cum dimidio saltem." He was well formed, with straight thick limbs. (iii) A dwarf seen at the wedding of the Duke of Bavaria 40 years previously. No height given.]

8. ALDROVANDI, ULYSSES: *Monstrorum Historia*, pp. 38—40 and p. 602. Bononiae, 1642. [He gives an account of Michele Magnan, aged 41, height about 30 "uncias," whose portrait is in the museum of the Senate at Bologna (see Iconog. No. 72) and also of the two dwarfs in Pedigree No. 733. There are pictures of the two last.]
9. GLISSON, FRANCIS, BATE, GEORGE, AND REGEMORTER, ANASUERUS: *A Treatise of the Rickets*, published in Latin in 1650 and translated by Phil. Armin, pp. 151—153. London, 1651. [Probably the first general account of the subject; pp. 151—153 are on heredity.]
10. JORNANDES: *De Getarum sive Gothorum origine et rebus gestis. Historia Gotthorum, Vandalorum et Langobardorum ab Hugone Grotio*, Cap. xxxv. p. 661. Amstelodami, 1655. [Gives description of Attila. "Forma brevis, lato pectore, capite grandiori, minutis oculis, rarus barba, canis aspersus, simo naso, teter colore, originis suae signa restituens."]
11. DOBRZENSKY, JAC. JOH. WENCESLAUS: *De Artificiale Pygmaeorum Efformatione. Miscellanea Curiosa sive Ephemeridum Medico-physicarum Germanicarum Academiae Naturae Curiosorum*, Annus Primus, Obs. LXXIX. pp. 160—161. Francofurti et Lipsiae, 1670. [He states that Dr Joannes Marcus of Prague had been asked by a religious man whether the method of making pygmies was natural or an art of the Devil. For a certain poor man had anointed his offspring from the day of their birth with an ointment made from dormice, bats, and moles and this ointment had dried up their spinal cord and prevented their bones from growing. They remained small and were presented to great people, and, dwarfs being fashionable, were a means of support to their parent.]
- 11^b. ZWINGER, THEODOR: *Pumiliones, Parvi, Pusilli, Nani. Theatrum Vitae Humanae*, Vol. xvii. Liber vi. p. 2576. Basiliae, 1671. [Gives a list of various small men, starting with Zacchaeus the publican.]
12. THEVENOT, J.: *Relation d'un voyage fait au Levant*, 2^e Partie, Chap. 68, pp. 475—476. Paris, 1674. [Gives an account of the arrival of the ambassador from Ethiopia at Cairo with presents for "le Grand Seigneur." Among them were diminutive black slaves from Nubia and other confines of Ethiopia.]
- 12^b. WANLEY, NATHANIEL: "Of Pygmies and Dwarfs and men much below the common height," *The Wonders of the Little World or a General History of Man in Six Books*, Book i. Chap. 23, pp. 36, 37. London, 1678. [Refers to dwarfs mentioned by Pliny, Plater, Zwinger, etc.]
13. DAPPER, OLFERT: *Naukeurige Beschrijvinge der Afrikaensche Gewesten van Egypten, Barbaryen, Lybien, Biledulgerid, Negrolant, Guinea, Ethiopien, Abyssinie, vertoont in de Benamigen, Grenspalen, Revieren, Steden, Gewaffen, Dieren, Zeeden, Drachten, Talen, Rijkdommen, Godsdiensten en Heerschappyen, met Lantkaarten en Afbeeldingen van Steden, Drachten, etc. getrokken nyt verscheide bedendayse Lantbeschrijvers en geschriften van bereisde Ondersoekers dier Landen door Dr O. Dapper*, Second Edition, pp. 166, 216, 218. Amsterdam, 1676. [p. 166, describing the kingdom of Loango or land of the Bramas, he says that there were dwarfs "met den rugh na hem toe gekeert," who were short in person but had large heads. The negros said there was a region full of forests, where only these dwarfs lived, and that most of the elephants were killed by them. These dwarfs were generally called Bakke-Bakke (? = Akkas), but also Mimos; p. 216 again refers to the elephants being killed by the dwarfs, who the Jagos said made themselves invisible and could thus get close to the elephants; p. 218 states that the kingdom of Makoko was north of the river Zaire and 200 or 250 "mijlen" inland from the coast of Lovango or Kongo and the dwarfs lived in the forests of this kingdom.]
14. CLAUDERUS, F. W.: *Nanorum generatio. Miscellanea Curiosa sive Ephemeridum Medico-physicarum Germanicarum Academiae Imperialis Leopoldinae Naturae Curiosorum*, Annus Octavus, Obs. ccxxii. p. 543. Norimbergae, 1689. [Pedigree No. 839.]
- 14^b. LA MOTHE, MARIE CATHERINE, COMTESSE D'AULNOY: *Relation du Voyage d'Espagne*, 2 Ed. T. III. pp. 169, 199, 225. La Haye, 1692. [Comtesse d'Aulnoy went to Spain in 1679. She visited the Queen Mother at Toledo and there "Une petite Naine, grosse comme un tonneau et plus courte qu'un potiron, toute vetue de brocard or et argent, avec de longs cheveux qui lui descendaient presque aux pieds, entra et se vint mettre à genoux devant la Reine pour lui demander s'il lui plaisait de souper." Cf. Iconog. Nos. 64^a and 64^b. On p. 199 reference is made to a giantess who held two female dwarfs on her hands; these were seen during a visit paid to the Queen Mother at Madrid. p. 225 describes the King's dwarf Louisillo. "Il est né en Flandre, et d'une petitesse merveilleuse, parfaitement bien proportionné. Il a le visage beau, la tête admirable et de l'esprit plus qu'on ne peut se l'imaginer; mais un esprit sage et qui sait

- beaucoup." He had a dwarf horse as well made as its master, "Quand il est monté dessus, ils ne font plus de trois quartiers de hauteur."]
15. TYSON, E. *The Anatomy of a pigmie compared with that of a monkey, an ape, and a man*. London, 1699. [Followed by the well-known "Philological Essay concerning the Pygmies of the Ancients": see No. 294 for reprint.]
 16. BANIER (ABBÉ): *Dissertation sur les Pygmées*. *Memoires de Litterature tirez des Registres de l'Académie des Inscriptions et Belles Lettres depuis 1718—1725*, pp. 101—116. *Histoire de l'Académie des Inscriptions et Belles Lettres*, T. v. Paris, 1729. [Title describes subject.]
 17. NICEPHORUS, CALLISTUS: *Ecclesiasticae Historiae*, Liber XII. Cap. xxxvii. p. 307. Paris, 1730. [He states that he saw a dwarf in Egypt, "tamen brevis fuit, ut pernici persimilis esset." He was about 25 years of age. His prudence was that of a well-formed man and his conversation showed superiority of mind. Garnier (Bibl. No. 205) reproduces a picture of this dwarf by Lycosthenes. Cf. *Iconog.* No. 126.]
 18. VALLISNERI, ANTONIO: *Opere fisico-mediche*, T. III. p. 455. Venezia, 1733. [Vallisneri states he had spoken to a well-made dwarf, with a long beard, who was exhibiting himself. He pretended he had come from India but his accent betrayed his Parmesan origin.]
 - 18^b. DU PLESSIS (James Paris, servant to Samuel Pepys): *Collections of Wonderful Prodiges*. 1730—1733. *Sloane Manuscripts*, Nos. 3253 and 5246. British Museum, London. [No. 3253 gives picture and history of John Grimes. Pedigree 760. No. 5246 gives pictures and accounts of Anne Rouse, John Worrenbergh (Wormberg), the Black Prince and his Lilliputian horse and Hannah Warton. MS. 5246 contains account of collection and how it passed into Sir Hans Sloane's possession. See *Iconog.* Nos. 171—175.]
 19. *The Spectator*, Vol. iv. 1711—1712, pp. 75—76. 12th Edition. Dublin, 1737. [There is a letter dated Jan. 10th, 1712, giving an account of two dwarfs, man and wife, the latter 2 feet high and encinte; they had a dwarf horse and were exhibited in London. See No. 18^b.]
 20. GEOFFROI, C. J.: *Histoire de l'Académie des Sciences avec les Mémoires de Mathématique et de Physique*, 1746, pp. 44—45. Paris, 1751. [Account of Bébé, Pedigree No. 745.]
 21. ARDERON, WM.: Extract of a letter from Mr Wm. Arderon, F.R.S., to Mr Henry Baker, F.R.S., containing an account of a dwarf, together with a comparison of his dimensions with those of a child under 4 years old by David Erskine Baker. The letter is dated Norwich, May 12th, 1750. *Philosophical Transactions of the Royal Society*, Vol. XLVI. pp. 467—470. London, 1752. [An account of John Coan of Twitschall, Norfolk. Height, 38 inches with hat, wig and shoes on. Weight, 34 pounds, including clothes. See p. 363 *supra*. No family history. Measurements given.]
 22. BROWNING, JOHN: Extract of a letter from John Browning, Esq., of Barton Hill near Bristol, to Mr Henry Baker, F.R.S., concerning a dwarf, Sept. 12th, 1751. *Philosophical Transactions of the Royal Society*, Vol. XLVII. pp. 278—281. London, 1753. [Pedigree No. 701.]
 23. KLEIN, L. G.: Rhachitis congenita atque hermaphroditi rumor. *Nova Acta Physico-medicae Academiae Caesareae Leopoldino-Carolinae. Naturae Curiosorum*, T. I. Obs. xxxviii. pp. 146—148. Norimbergae, 1754. [Description of an achondroplastic (?) twin. No family history.]
 - 23^b. HAY, W.: *Deformity, an Essay*. London, 1754. [p. 4, "I am scarce five feet high, my back was bent in my mother's womb, and in person I resemble Esop, the Prince of Orange, etc.": see p. 360 *supra*.]
 24. BIRCH, THOS.: *History of the Royal Society of London*, Vol. iv. p. 500. London, 1757. [Letter from Mons. Justel read Nov. 3rd, 1686, giving an account of a dwarf from Quimpercorantin, Lower Bretagne, aged 37, height 16 inches, who had a great beard. No family history.]
 25. MOREL: *Diversités anatomiques. Vandermonde's Recueil périodique d'observations de médecine, chirurgie, pharmacie, etc.*, T. VII. pp. 432—441. Paris, 1757. [Description of the skeleton of a rachitic child, still-born at full term, which Morel had in his collection. Length of skeleton from crown of head to level of heels "12 pouces."]
 26. SANDEL, SAMUEL: Account of two children of an uncommon small stature. *Medical, Chirurgical and Anatomical Cases and Experiments*, communicated by Dr Haller and other eminent physicians to the Royal Academy at Stockholm, translated from the Swedish, pp. 68—71. London, 1758. [Pedigree No. 833.]
 27. MARIN: *Histoire de Saladin, Sulthan d'Egypte et de Syrie*, T. I. pp. 88—89 and 158. Paris, 1758. [Note on p. 89 refers to Schirkouh; the name of this Kurd is written in different ways, Schirucouh, Schiracus, Schiragouh, Schirgouh. Historians write it Siracon. It means "lion of the mountain." Schirkouh was uncle of Saladin, who reaped the fruit of his victories. He is thus described on p. 158: "Schirkouh étoit petit de taille et fort gros, d'une figure

- austère, d'un caractère dur et farouche, et d'un esprit peu éclairé." Apparently it is this Schirkouh who appears later as the dwarf Characus: see p. 359.]
28. *LA VERGNE DE TRESSAN, LOUIS E. DE: *Mémoire sur un Nain. Académie des Sciences*. Paris, 1760. [A Memoir on the dwarfs Boruwlaski and Bébé. Said to be presented to Académie, it cannot be found in the *Mémoires*: see, however, No. 41.]
 29. HOUTLUYN, F.: *Natuurlyke Historie of uitvoerige Beschrijving der Dieren, Planten en Mineralien, volgens het Samenstel van den Heer Linnaeus. Mit naaruukeurige Afbeeldingen*, Deel i. p. 148. Amsterdam, 1761. [States the Archduke Frederick had a dwarf at his court 3 "Spannen" long and mentions Bébé and Boruwlaski. A note at foot of page says a Frieslander had been in Amsterdam, aged 21, on Mar. 2, 1751, and no higher than "negen en twintig Amsterdamsche Duimen, en biggevolg nog omtrent anderhalf Duim kleiner."]
 30. KLEIN, J. H.: *Dissertatio inauguralis medica sistens casum rhacitidis congenitae observatae in infante varie monstroso*. Argentorati, 1763. [This is a description of the case recorded by his father, L. G. Klein. See Bibl. No. 23.]
 31. BORDENAVE: Description d'un foetus mal conformé. *Mémoires de mathématique et de physique présentées à l'Académie des Sciences*, T. iv. pp. 545—550. Plate. Paris, 1763. [A male foetus of 7 months, length "9½ pouces" from the crown of the head to the heels, which touched the buttocks.]
 32. Article: Nains. *Diderot et d'Alembert's Encyclopédie*, T. xi. pp. 7—8. Neuchatel, 1765. [Signed D. J., written in 1760 and giving an account of Bébé and Boruwlaski.]
 33. BUFFON, G. L. L.: *Histoire Naturelle générale et particulière*, T. xv. pp. 176—185. Paris, 1767. [Description and measurements of the skeletons of Bébé and of a rachitic girl of 10 or 11 years of age.]
 34. LETTRE ENVOYÉ PAR M. D. À MONS. LE COMTE DE — : Sur un nain monstrueux existant actuellement dans la Ville de Lubni. *Introduction aux Observations sur la Physique, sur l'Histoire Naturelle et sur les Arts*, T. L. pp. 295—296. Paris, 1771. [An account of the dwarf Pierre Danlow Bereschny. Height 29¼ "pouces." He had no arms, no neck, and no joints to his knees.]
 35. *MUSSOT, ARNOULD FRANÇOIS: Spectacles des Foires et des Boulevards de Paris. *Calendrier historique et chronologique des théâtres forains*. Paris, 1776. [Quoted by Garnier (Bibl. No. 205). Pedigree No. 748.]
 36. BUFFON, G. L. L.: Nains. *Histoire Naturelle générale et particulière*, T. iv. Supplément, pp. 400—404 and 505—512. Paris, 1777. [A few remarks on some well-known dwarfs, Bébé, Boruwlaski, the Norfolk dwarf, etc.; pp. 505—512 refer to "Les Nains de Madagascar." See p. 356 *supra*.]
 37. LAVATER, J. C.: *Physiognomische Fragmente zur Beförderung der Menschenkenntnis und Menschenliebe*, Theil iv. S. 72. Leipzig und Winterthur, 1778. [Short note on a picture of C. H. Stoberin, aged 16, and not more than "2 Fuss" in height. See Iconog. No. 138.]
 38. CHANGEUX, P. C.: Dissertation sur les nains et les géants, et sur les vraies limites de la taille humaine. *Observations sur la Physique, sur l'Histoire Naturelle et sur les Arts*, Supplément, T. xiii. pp. 167—171. Paris, 1778. [The chief subject of this dissertation is, the author says, "Rapports singuliers qui se trouvent entre les Nains et les Géants."]
 39. KÜHN, D.: Kurze Geschichte einer Zwergfamilie. *Schriften der Berlinischen Gesellschaft naturforschender Freunde*, Bd. i. S. 367—372. Berlin, 1780. [Pedigree No. 794.]
 40. VAN WURMB, F.: Kitip, een klein en simeetrisch wanschappen Mensch. *Verhandelingen van het Bataviaasch Genootschap der Kunsten en Weetenschappen*, Deel 3. pp. 339—344. Batavia, 1781. [An account and full measurements of Kitip, a six-fingered and six-toed achondroplastic (?) dwarf. Height "2 voeten, 11 duim, Engelse maat." He was a native of Bali. His parents and several brothers and sisters were normal.]
 41. Article: Sur les Nains. *Histoire de l'Académie des Sciences de Paris*, pp. 62—71, 1764. Also *Collection Acad. de Mémoires, etc.*, T. xiii. pp. 347—355. Paris, 1786. [Résumé of Bibl. No. 28 and of Morand's paper read Nov. 1764 on Bébé and Boruwlaski.]
 42. WALPOLE, HORACE: *Anecdotes of Painting in England*, 4th Edition, Vol. iii. pp. 116—188 and p. 257. London, 1786. [An account of Gibson the dwarf artist is given. Pedigree No. 699.]
 43. BORUWLASKI, JOSEPH: *Memoirs of the celebrated Dwarf, Joseph Boruwlaski*. London, 1778. [Written originally in French by himself, translated by M. des Carrières. The French and English versions are intermixed. Portrait of Boruwlaski with his wife and child as frontispiece. Pedigree No. 693. See Iconog. Nos. 143 and 144.]
 44. EKMAN, OLAUS F.: *Descriptionem et Casus aliquot Osteomalaciae sistens*, *Dissertatio medica*, pp. 5—10. Upsaliae, 1788. [Pedigree No. 781.]
 45. FLÖGEL, KARL FRIEDRICH: *Geschichte der Hofnarren*, S. 500—530. Liegnitz und Leipzig, 1789. [Gives an account of the court dwarfs of Imperial Rome and mediaeval Europe.]

46. SOEMMERING, SAMUEL THOS.: *Abbildungen und Beschreibungen einiger Missgeburten*, S. 30, Tafel xi. Mainz, 1791. [Gives picture and some measurements of an achondroplastic (?) infant.]
47. BORUWLASKI, J.: *Mémoires du célèbre Nain*. Birmingham, 1792. [An edition in French of the Memoirs originally published in 1788. See Bibl. No. 43, Pedigree No. 693.]
48. GUTHRIE, MATTHEW: *Nains des Anciens et des Russes. Dissertations sur les Antiquités de Russie*, trans. from the English, p. 153. St Petersburg, 1795. [p. 153 gives the history and description of Prascovia Ivanovna, dwarf of Peter the Great. Her height is not given. She looked like a child of 6 or 8 years of age. She must have been nearly 100 years old, and was still active, with full use of her eyes, legs, and teeth. She complained of no infirmity at date 15 Oct. 1794, after 80 years' sojourn in Russia. Guthrie states there were at that time a number of old dwarfs collected both in the old and new capitals of the Empire, since they had ceased to be fashionable as retainers of great houses.]
49. LUDWIG, CH. F.: *Grundriss der Naturgeschichte der Menschenspecies*, S. 154—155. Leipzig, 1796. [Gives references to various dwarfs. Pedigree No. 724.]
50. WÜNSCH, CH. E.: *Unterhaltungen über den Menschen*, Theil i. 2 Ed. Zehnter Unterhaltung. S. 319 and 320. Coloured Plate. Leipzig, 1796. [Refers to Bébé, Boruwlaski and C. H. Stöberin. The plate gives Bébé and C. H. Stöberin with other figures. C. H. Stöberin was almost 3 feet in height and well proportioned: see Bibl. No. 49 and Iconog. No. 138.]
51. OSIANDER, F. B.: *Historia partus nanæ, versionis negotio, a foetu vivo feliciter liberatæ*. Plate. Gottingæ, 1797. [Pedigree No. 627.]
52. DUMERIL, C.: Notice sur un homme mort à l'âge de soixante-deux ans, dont les bras, les avant-bras, les cuisses et les jambes ne s'étoient pas développés. *Bulletins des Sciences, par la Société Philomatique*, N°. iv. 7^e année, T. III, avec une planche XIII. pp. 122—124. Paris, Messidor, An 11 de la République, 1800. [Gives an account of Marc Catozze, called "le petit nain." His parents, brothers and sisters were normal. The trunk and sexual organs were normal. Well-formed hands grew from his shoulders, and the lower limbs consisted of flattened buttocks which supported badly developed but complete feet. He would have had great difficulty in feeding himself but for a peculiar conformation of the lower jaw which enabled him to so protrude and lower it that he could bring it towards the food. He could ride and shoot. There is a plate of the skeleton.]
53. KIRBY, R. S.: *Wonderful and Eccentric Museum, or Magazine of remarkable Characters*. London, 1804—1820. [Vol. i. p. 95: Account of the dwarf John Coan and a dwarf from Glamorgan-shire aged 15, height 30 in., weight 12 lbs. Vol. ii. pp. 145—150: Accounts of Simon Paap, with Plate, height 28 in., weight 27 lbs.; Miss Smith and Mr Leach. Vol. iii. p. 113: Account of George Romondo, with Plate, height 42 in., a clever mimic. pp. 406—413: Accounts of Bébé, Boruwlaski, Peter Dantlow, and Don Jozé Cordero Pereira. Vol. v. pp. 228—229: Accounts of Nannette Stocker and Johann Hauptmann, with Plate. p. 364: Account of the Irish dwarf Owen Farrel, with Plate. See our pp. 363, 370 and Plates II (69), JJ (72) and KK (73) and (74).]
54. DUPUYTREN: Extrait de la description d'un nain de vingt-six mois présenté à la Société le 24 Juillet 1806. *Bulletin de la Faculté de Médecine de Paris*. No. VIII. pp. 146—148. Paris, 1806. [Pedigree No. 756.]
55. CAULFIELD, JAMES: *Portraits, Memoirs and Characters of Remarkable Persons from the Reign of Edward the Third to the Revolution*. A new edition, completing the 12th Class of Granger's Biographical History of England, with many additional rare portraits, Vol. i. p. 8, Vol. ii. p. 128, and Vol. iii. p. 284. London, 1813. [i. p. 8, portrait of John Jarvis, 3 feet 8 inches in height, who died 1558 or 1560, aged 57. The portrait was taken from a statue carved in oak and coloured to resemble life. He was page of honour to Queen Mary. ii. p. 128, portrait of Jeffrey Hudson. iii. p. 284, portrait of John Wormberg, aged 38, height 31 inches: see Bibl. No. 18^b.]
56. Obituary with Anecdotes of remarkable Persons. *The Gentleman's Magazine*, Jan. 1813, Vol. 83, p. 92. London, 1813. [Pedigree No. 799.]
57. CHAUSSIER: Sur les fractures et les luxations observées chez des foetus encore contenus dans la matrice, et faussement attribuées à l'imagination de la mère. *Bulletin de la Faculté de Médecine de Paris*, T. III. pp. 301—311. Paris, 1813. [Pedigree No. 826.]
58. HOME, SIR EVERARD: *Lectures on Comparative Anatomy*, Vol. i. p. 81. London, 1814. Vol. v. pp. 191—192. London, 1828. [He mentions Boruwlaski, and the reports of a race of pygmies in Madagascar which he thinks fabulous, and gives the history of Caroline Crachami. Pedigree No. 717.]

59. OTTO, ADOLPH WILHELM: Eine menschliche Missgeburt, mit monströs kurzen obern und untern grossen Gliedern. Plate. *Seltene Beobachtungen zur Anatomie, Physiologie und Pathologie gehörig*, Heft 1. S. 1—9. Breslau, 1816. [Full description of a male foetus. Weight "7 Pfund und 2 Loth." Length "17 Zoll rheinl."]
60. *DORNIER: *Description d'une miniature humaine*. Paris, 1817. [Description of Babet Schreier.]
61. ROMBERG, M.: *De Rhachitide Congenita*. Dissertatio Inauguralis. Berolini, 1817. [A general account of the disease and Pedigrees Nos. 659 and 660.]
62. BÉCLARD: Note sur une naine de l'âge de sept ans ayant à peu près les proportions d'un enfant naissant. *Bulletin de la Faculté de Médecine de Paris*, 1816—1817, T. v. pp. 486—488. Paris, 1818. [This appears to be an account of Babet Schreier. Pedigree No. 703.]
63. CHAUSSIER ET ADELON: Article Monstre. *Dictionnaire des Sciences Médicales*, T. xxxiv. pp. 210—213. Paris, 1819. [Gives accounts of several dwarfs, including Babet Schreier. Pedigree No. 703.]
64. VIREY, J. J.: Article Nains. *Dictionnaire des Sciences Médicales*, T. xxxv. pp. 145—153. Paris, 1819. Also *Histoire Naturelle du Genre Humain*, T. II. pp. 263—272. Paris, 1824. [Pedigrees Nos. 698 and 702 (Barbe and Thérèse Souvray).]
65. CAULFIELD, JAMES: *Portraits, Memoirs and Characters of Remarkable Persons from the Revolution in 1688 to the end of the reign of George II*, Vol. III. pp. 230—232. London, 1819. [Portrait and account of Owen Farrel, the Irish dwarf, whose skeleton and portrait were said to be preserved in the Hunterian Museum, Glasgow, but the skeleton is not there now. His height was 3 ft. 9 in.]
66. CARUS, C. G.: Funfter Jahresbericht über den Fortgang des königlichen Sächs. Entbindungs- und Hebammen-Instituts zu Dresden im Jahre 1819. *Leipziger Literatur Zeitung*, 1820, No. 93, S. 737—741. Leipzig, 1820. [Pedigree No. 780.]
67. FRANK, LUIGI: Storia di una intiera famiglia nana esistente in Parma. *Memorie della Reale Accademia delle Scienze di Torino*, T. xxv. pp. xvi.—xviii. Torino, 1820. [Pedigree No. 747 (Leporati family).]
68. *JAEGER, G. F.: *Vergleichung einiger durch Fettigkeit oder colossale Bildung ausgezeichneten Kinder und einiger Zwerge*. Stuttgart, 1821.
- 68^b. WILSON, HENRY: *Wonderful Characters, comprising Memoirs and Anecdotes of the most remarkable Persons of every Age and Nation*. London, 1821—22. [Vol. I. p. 88: Notice and picture of Jeffrey Hudson standing beside Charles I. p. 216: Notice and picture of Jeffrey Dunstan, known as Sir Jeffrey Dunstan, Mayor of Garrett. He was dwarfish in size and knock-kneed, and his head was disproportioned to his body. In the picture he looks rickety. Vol. II. p. 375: Notice and picture of Wybrand Lolkes and his wife. Vol. III. p. 385: Notice and picture of Joseph Boruwlaski, wife and child.]
69. MECKEL, J. F.: *Anatomisch-physiologische Beobachtungen und Untersuchungen*, S. 9 u. 45. Halle, 1822. [Pedigree No. 640.]
- 69^b. SMEETON, GEORGE: *Biographia Curiosa or Memoirs of remarkable Characters of the reign of George III*, pp. 38, 75, 205, 235. London, 1822. [p. 1 gives picture and notice of Madame Teresia, the Corsican Fairy, born on the mountain of Stata Ota in 1743 and exhibited in London, 1773. Her height was 34 in., weight 26 lbs. She was exceedingly well proportioned. p. 38: Notice and picture of Wybrand Lolkes and his wife. p. 75: Notice and picture of Boruwlaski, wife and child. p. 205: Notice and picture of Jeffrey Dunstan. p. 235: Notice and picture of Simon Paap.]
70. HONE, WM.: *The Everyday Book*, Vol. I. pp. 1171, 1190, 1194. London, 1826. [p. 1194 mentions Thos. Day, a dwarf 35 inches in height, who said he was aged 35 and who was the reputed father of a dwarf family. They were exhibited at St Bartholomew's fair. No particulars are given of the family, except that there was a boy aged 6, only 27 inches in height. p. 1171 gives a picture of a dwarf, Lydia Walpole, 2 ft. 11 inches in height; p. 1190 gives a picture of a male dwarf 3 feet in height.]
71. SARTORIUS, CHRISTOPHER FRIEDRICH: *Rhachitidis congenitae Observationes*. Diss. Inaug. Leipzig, 1826. [Four cases are described: (1) A male, the child of healthy parents, who died some days after birth. The length and weight were almost normal; "pondus quippe erat librarum quinque cum quadrante et longitudo sedecim pollicum," but the long bones of the extremities were fractured. (2) The skeleton of a male infant, "aequat ejus longitudo tredecim pollices ulnae lipsiensis." The long bones of the extremities appeared to have been fractured and to have united again. No family history. (3) The skeleton of a still-born

- infant, unsexed. The mother, aged 36, was healthy and had had several previous confinements. The length of the skeleton is not given, its extremities were curved and deformed. (4) The skeleton of a female infant, "quindecim pollices longus," the bones of the extremities were short, thick and curved. Plates of (2), (3) and (4) are given. (2) looks achondroplastic, the other cases appear more doubtful. The rest of the dissertation is a general discussion of the subject.]
72. ROULIN: Sur une naine mexicaine. *Le Globe*, T. vii. p. 790. Paris, 1829. Account of a female Mexican dwarf born in the province of Zacatecas of a mother of pure Indian race. She was aged 17. Height $27\frac{1}{2}$ "pouces," with arms, hands and feet well made. Her hips were a little large.
 73. WEBER, M. J.: Ueber rhachitische Foetus. *Siebold's Journal für Geburtshülfe, Frauenzimmer- und Kinderkrankheiten*, Bd. ix. S. 292—297. Frankfurt-am-Main, 1830. [A description of two achondroplastic (?) foetuses. The mothers were healthy and had several healthy children.]
 74. OTTO, ADOLF WILHELM: Of Vices relating to Size. *Compendium of Human and Comparative pathological Anatomy*, translated from the German with additional notes and references by John F. South, pp. 21—22. London, 1831. [p. 21, Note, mentions Joseph Hoedle of Endingen, height 30 inches, and Elizabeth Ralph of Devonshire, aged about 21, height 34 in., weight 20 pounds. It also states that among Mr Hunter's papers is a memorandum without name or date of a dwarf woman at Norwich, height 34 inches, who was delivered of a child which measured 22 inches. The woman died 4 hours after delivery. p. 22, Note, mentions Drunken Andrew, who used to sit at Blackfriars Bridge; he was of small make, except for his head.]
 75. GEOFFROY-SAINT-HILAIRE, ISIDORE: Des Anomalies par diminution générale de volume et spécialement les nains. *Histoire générale et particulière des anomalies de l'organisation chez l'homme et chez l'animal*, T. i. pp. 140—165. Also pp. 220 and 253, and T. ii. pp. 208—213. Paris, 1832. [A general account of dwarfs. A note on p. 164 states that M. Underwood told him there was a portrait of a female dwarf 33 inches high (who was exhibited in London, 1784) in the Hunterian Museum, London, and that she died giving birth to a child.]
 76. MANSFELD: Beschreibung eines Skeletts mit angeborener Rhachitis und Bemerkungen darüber. *Gräfe und Walther's Journal der Chirurgie und Augen-Heilkunde*, Bd. 19, S. 552—565. Berlin, 1833. [Pedigree No. 770.]
 77. TEMPLE, SIR GRENVILLE T.: *Excursions in the Mediterranean, Algiers and Tunis*, Vol. ii. Chap. x. p. 180. London, 1835. [Pedigree No. 768 (Dwarf Abou Zadek).]
 78. BUSCH, R.: Ein Fall von Rachitis congenita. *Neue Zeitschrift für Geburtskunde*, Bd. iv. S. 110—113. Berlin, 1836. [Description of a still-born female achondroplastic (?) child. Length "12½ Zoll." No family history.]
 79. GEOFFROY-SAINT-HILAIRE, ISIDORE: Nain de Bréda, en Illyrie. *Comptes Rendus de l'Académie des Sciences*, T. iii. p. 480. Paris, 1836. [An account of Mathias Gulia, a well-proportioned dwarf aged 22, whose height was not above one metre.]
 80. BANCEL: Rapport sur la communication des conditions d'existence d'une fille naine à Valognes. *Comptes Rendus de l'Académie des Sciences*, T. v. p. 839. Paris, 1837. [Bancel, a doctor at Valognes (Manche), sent a description of a girl aged 18½ years, height 34 "pouces," not deformed and with no trace of rickets. Serres and Geoffroy-Saint-Hilaire considered the report untrustworthy.]
 81. NÄGELE, FR. CARL: *Das schräg-verengte Becken*, S. 101—102. Mainz, 1839. [Pedigree No. 726.]
 - 81^b. Article: Quelques nains célèbres. *Le Magasin Pittoresque*, Septième Année, pp. 332—334. Paris, 1839. [On p. 333 there are pictures of Jeffrey Hudson in a pie, of Wybrand Lolkes and his wife and of Bébé with a dog. Wybrand Lolkes has a large head and very short legs, which appear somewhat curved, but his trunk also looks very short: see Iconog. Nos. 142 and 158.]
 82. DUBOIS, PAUL: Accouchement prématuré chez une naine. *Archives générales de Médecine*, 3^e Série, T. vii. pp. 513—514. Paris, 1840. [Pedigree No. 783.]
 - 82^b. LISTON, ROBERT: *Elements of Surgery*. London, 1840. [Plate ii reproduces an achondroplastic (?) skeleton, but there does not appear to be any description of it, unless the remark on congenital rickets, p. 130, applies to it.]
 83. OTTO, ADOLF WILHELM: *Monstrorum sexcentorum descriptio anatomica. Museum Anatomico-pathologicum Vratislaviense*, pp. 319—322. Vratislaviae, 1841. [Descriptions of achondroplastic (?) foetuses, human and other. Tafel xxii gives a picture of an achondroplastic (?) infant. No measurements.]

84. NEUMANN: Ueber eine Familie von Zwergen. *Wochenschrift für die gesammte Heilkunde*, No. 44, S. 705—707. Berlin, 1842. [Pedigree No. 694 (Goerke family).]
85. SCHUETZE, E. G.: *Symbolae ad ossium recens natorum morbos*. Dissertatio Inauguralis. Plate. Berolini, 1842. [Three cases are described: (1) A still-born female infant, "octo libras gravis et quindecim pollices longa," whose extremities were very thick and short. She was the sixth child of a scrofulous woman aged 33, three of whose children had died young and of the two survivors the elder was rachitic and delicate, and the glands of the younger were affected. A full description and measurements are given. (2) A female infant, who lived six weeks, with large head and short thick extremities. The mother, a prostitute aged 22, was of small stature, born of small parents who had had 18 children, most of whom died young. She herself had had two premature confinements, one at 5 months, the other at 7 months, a still-born male, who was abnormal in many ways. (3) A foetus preserved in spirits with very short extremities. No family history.]
86. TREVISANI, LUIGI: Alcuni cenni su Antonio Toselli, nano di Pensale. *Rendiconti Accademia Medico-chirurgica di Ferrara*. Seduto, 3 Settembre, 1841. *Bullettino delle scienze mediche della Società Medico-chirurgica di Bologna*, 3 Serie, T. III. pp. 60—63. Bologna, 1843. [Pedigree No. 700 (Antonio Toselli).]
87. SONNTAG, ERNST HEINRICH: *De rachitide congenita*. Dissertatio Inauguralis. Heidelberg, 1844. [Four cases are described: (1) Pedigree No. 820. (2) A female infant, length from vertex to perineum 8" 6" with short extremities. (3) Female foetus also with short extremities. (4) Skeleton of a rachitic foetus. Then follows a general discussion of the subject.]
88. HUTTON, CATHERINE: A memoir of the celebrated dwarf Joseph Boruwlaski. *Beniley's Miscellany*, Vol. XVII. pp. 240—249. London, 1845. [Title describes subject: see Bibl. Nos. 28, 41 and 43.]
89. HECKER: Der Zwerg Margarethe Leonhard, von Villmar. *Medicinische Jahrbücher für das Herzogthum Nassau*, Heft v. S. 48—54. Wiesbaden, 1846. [Pedigree No. 730.]
90. Article: Highland Dwarfs. *Illustrated London News*, May 30, 1846, p. 357. London, 1846. [Pedigree No. 721.]
91. *DE RENSIS, FELICE: *L'Ateneo*. Napoli, 1846. [?Something as to dwarfs.]
92. LEISINGER, J.: *Anatomische Beschreibung eines kindlichen Beckens von einem 25 Jahre alten Mädchen*. Inaug. Diss. Tübingen, 1847. [Account of the abnormally diminutive pelvis, infantile in character, of a woman 25 years old of medium (52 P.") stature. There was no trace of pathological change or bone disease; while the pelvis was comparable with that of a child, the uterus resembled that of a new-born infant.]
93. LAWRENCE, SIR WM.: *Lectures on Comparative Anatomy, Physiology, Zoology, and the Natural History of Man*, 9th edition, p. 296. London, 1848. [He states that the parents, brothers and sisters of C. H. Stöberin were dwarfs and quotes Lavater (Bibl. No. 37) and Ludwig (Bibl. No. 49) as authorities. No mention of her family could however be found in Lavater.]
94. GURLT, ERNESTUS: *De ossium mutationibus rhachitide effectis*. Dissertatio Inauguralis. Plate. Berolini, 1848. [This paper, which is constantly referred to, deals with rachitis in general. It is divided into two parts, (i) De degeneratione ossium rhachitica in genere, (ii) De deformatione ossium rhachitica in specio.]
95. BARNES, R.: Dwarf exhibited. *Transactions of the Pathological Society*, Vol. II. pp. 126—128. London, 1848—1849. [Mentions two dwarfs, a male dwarf who measured 28 inches when about 9 years old, and whose trunk and limbs in form and proportion were those of a child aged 2 years, and a female dwarf, aged 31, whose skeleton measured 45½ inches.]
96. SCHULZ, G. R. AUGUST: *Ueber Rhachitis Congenita*. Inaug. Diss. Giessen, 1849. [Four foetuses with short extremities are described. (1) A male, length 22 cm. (2) A female, length 36 cm. (3) A female, length 36 cm. (4) A female, length 29 cm. Then follows a more general discussion of the subject. No family history.]
97. WALPOLE, HORACE: *Anecdotes of Painting*. A new edition revised with additional notes by Ralph Wornum Vol. II. p. 533. London, 1849. [This edition has portraits of Richard Gibson, the dwarf painter, and Anne Shepherd his dwarf wife, but they are only miniatures of head and bust. Copied from drawing in Royal Library, Windsor: see Iconography.]
98. FOX, HENRY RICHARD VASSAL, LORD HOLLAND: *Foreign Reminiscences*, p. 146. London, 1850. [Note on p. 146 says, "The Duke of Altamira, Marquis of Astorga, was the least man I ever saw in society and smaller than many dwarfs exhibited for money. He was President of the Junta, and drove about with guards like a royal personage. They called him Rey Chico, a name formerly given to a King of Grenada, and it was in allusion to that name that the small club or knot of men I have mentioned gave themselves that of Junta Chica."]

99. QUETELET: Sur un nain belge. *Bulletins de l'Académie Royale des Sciences de Belgique*, T. xvii. 1^e Partie, pp. 344—347. Bruxelles, 1850. [Pedigree No. 735.]
100. DEPAUL, J. A. H.: Foetus rachitique. *Bulletin de l'Académie de Médecine de Paris*, T. xvi. pp. 73—74. Paris, 1851. [Gives a very short account of an 8½ months child with deformed limbs. He said he would make a further communication on the subject when he had mounted the skeleton. See Bibl. No. 165.]
101. Article: The Fairy Queen. *The Illustrated London News*, May 24, 1851, p. 450. London, 1851. [Pedigree No. 720: see also Bibl. No. 138.]
102. MICHAELIS, GUSTAV ADOLF: *Das enge Becken*, S. 163. Leipzig, 1851. [Pedigree No. 725.]
103. WARREN, J. M.: An account of two remarkable Indian dwarfs exhibited in Boston under the name of Aztec children. *American Journal of Medical Science*, Vol. xxi. No. 5, pp. 285—293. Philadelphia and London, 1851. [Title explains subject: see Bibl. No. 113.]
104. VIRCHOW, RUDOLF: Das normale Knochenwachsthum und die rachitische Störung desselben. *Virchow's Archiv*, Bd. v. S. 409—507. Berlin, 1853. [p. 490 describes the skeleton of a foetus, (?) achondroplasic.]
105. CHARTON, EDOUARD: *Voyageurs Anciens et Modernes*, T. i. p. 160; T. ii. p. 389. Paris, 1854. [p. 160 quotes Ctesias. A curious picture on this page, called "Pygmées asiatiques d'après un dessin de l'Encyclopédie japonaise," represents five pygmies arm-in-arm, Japanese in type, with a large crane with open beak hovering over them. p. 389, quoting Marco Polo, says that in the island of "Java la petite" (Sumatra) they skin small monkeys, take off all the hair except the beard and the hair on the breast and pass them off as small men.]
106. KOENIG, FRANZ: *Beschreibung eines kindlichen Beckens und kindlicher Geschlechtstheile von einem achtzehn Jahre alten Mädchen*. Inaug. Diss. Marburg, 1855. [This dissertation is frequently referred to in articles on dwarf growth. It gives a long description of the infantile pelvis and genital organs of the girl, who was quite incapable of child-bearing; but she was not a dwarf. Superficially she appeared well developed for her age, was over middle height and broad in proportion.]
107. VIRCHOW, RUDOLF: Zur Pathologie des Schädels und des Gehirns. *Gesammelte Abhandlungen zur wissenschaftlichen Medizin*, S. 885—1014. Frankfurt a. M. 1856. [This paper is chiefly about cretinism, with some cretin pedigrees. S. 976 gives full description of a new-born infant, 33 cm. in length with flexed thighs. Virchow calls it a cretin, but its extremities appear to be of the achondroplasic type.]
108. LECADRE, ARTHUR J. *Étude sur le Rachitisme congénital*. Thèse. Paris, 1856. [Pedigree No. 763.]
109. *LAGARDE: *Rachitisme intra-utérin*. Thèse. Paris, 1856.
110. SCHREIER, F.: Die Entbindung einer Zwergin. *Monatsschrift für Geburtskunde und Frauenkrankheiten*, Bd. 8, S. 116—121. Berlin, 1856. [Pedigree No. 707.]
111. DUMENIL, L.: Description du squelette d'un foetus rachitique. *Gazette des Hôpitaux*, 3^e Série. Année ix. p. 396. Paris, 1857. [Description of the skeleton of a foetus born at term, length 35 cm.]
112. SÄNGER, W. M. H.: *Beschrijving van eens misvormde menschelijke Vrucht, benevens eenige Opmerkingen omtrent de zoogenaamde aangeboren enjelsche Ziekte (Rachitis Congenita)*. Inaug. Diss. Leyden, 1857. [This gives a full description of a female child with short curved limbs. Total length 14 "duim," and then follows a general discussion on such deformities. There is a good plate of the child.]
113. MAYER, F. J. C.: Ueber die Azteken Liliputaner. *Verhandlungen d. naturh. Verein. d. preuss. Rheinl. u. Westphal.*, Bd. xiv. S. lxi.—lxx. Bonn, 1857. [A description of the two Aztec dwarfs, said to be the offspring of an Indian man and negro woman: see also Bibl. No. 103.]
114. VIRCHOW, RUDOLF: Knochenwachstum und Schädelformen mit besonderer Rücksicht auf Cretinismus. *Virchow's Archiv*, Bd. xiii. S. 323—357. Berlin, 1858. [On p. 389 there are some remarks on the bones of dwarfs. p. 353 gives a description of a new-born child, (?) achondroplasic. Virchow considers it a cretin: see Bibl. No. 107.]
115. BROWN, J. The Black Dwarf's Bones. *Horae subsecivae*, pp. 413—436. Edinburgh, 1858. Reprint, *The World's Classics*, pp. 247—262. London, New York, and Toronto, 1907. [Gives two letters written by Robert Craig, a surgeon, giving an account of David Ritchie, the original of the Black Dwarf. He was 4 ft. in height, his shoulders rather high, but his body otherwise the size of ordinary men. His legs were bent in every direction, but the principal turn they took was from the knee outwards, so that he rested on his inner ankles and the lower part of his

- tibias. Brown possessed the femur and tibia and says, "They seem to have been blighted and rickety, the thigh-bone is very short and slight and singularly loose in texture, the leg-bone is dwarfed but dense and stout."]
116. HUMPHRY, SIR GEORGE MURRAY: *A Treatise on the Human Skeleton*, pp. 100—102. Cambridge, 1858. [A few remarks on the proportions of dwarfs.]
 - 116^b. *VERATTI, GIUSEPPE: *Mostruosità e perfezione. Il Raccoglitore Medico*, Ser. 2^a, T. xvii. p. 474. Fano, 1858. [An early account of the Magri family is given in this paper.]
 117. RIEDEL: *Verhandlungen der Gesellschaft für Geburtshülfe in Berlin. Sitzung am 9 Nov. 1858. Monatsschrift für Geburtskunde und Frauenkrankheiten*, Bd. xiii. S. 11. Berlin, 1859. [Riedel exhibited a deformed foetus, with large head, normal trunk and abdomen, and extraordinarily short extremities.]
 118. *LAFONT-MARRON, H.: *Du rachitisme intra-utérin*. Thèse. Paris, 1859.
 - 118^b. MORLEY, HENRY: *Memoirs of Bartholomew Fair*. London, 1859. [There are references to various dwarfs scattered through pp. 321—331. p. 321 gives Pedigree No. 718. p. 460 gives a picture of Keham Whitelamb born at Wisbech. Age 22. Height(?) He is represented standing at the door of a covered case in which he used to be carried about; type of dwarfism doubtful. p. 462 has a notice of Thomas Allen and Lady Morgan. p. 476 gives picture and autograph of Simon Paap: see Pedigree No. 806.]
 119. Article: Indian Dwarf. *The Illustrated London News*, May 12, 1860, p. 453. London, 1860. [Picture and account of Mohammed Baux, born in Benares 1839. Height about 37 inches. His parents, brothers, and sisters were all rather above middle height.]
 120. MÜLLER, H.: Ueber die sogenannte foetale Rachitis als eigenthümliche Abweichung der Skelotbildung und über ihre Beziehungen zu dem Cretinismus bei Thieren, sowie zu der Bildung von Varietäten. *Würzburger medicinische Zeitschrift*, Bd. i. S. 221—276. Würzburg, 1860. [Chiefly a discussion on abnormal calves, with some reference to human foetuses: see p. 386 *supra*.]
 121. LEVY: Beretning om Forløsningen af en Dverg med Udmaalinger af Skeletet og Bækonet. *Bibliothek for Læger*, Femte Raekke, Første Bind, Juli—Oct. 1860, S. 304—316. Kjøbenhavn, 1860. [Pedigree No. 708.]
 122. HINK, WILHELM: Zur paediatrischen Casuistik exquisite Rhachitis congenita, Craniotabes und rhachitische Missbildung der Rohrenknochen der obern und unteren Extremitäten. *Zeitschrift der kaiserlichen königlichen Gesellschaft der Aerzte zu Wien*, S. 107—108. Wien, 1860. [Description of a female infant with short and deformed extremities, the first child of a healthy mother, aged 19. Some measurements are given.]
 123. BRAUN, C.: *Wochenblatt der Zeitschrift der kaiserlichen königlichen Gesellschaft der Aerzte zu Wien*, Jahrgang xvii. S. 223. Wien, 1861. [Prof. Carl Braun showed the body of a new-born child with peculiar S curvature of the four extremities, an anomaly hitherto known as Rachitis congenita.]
 - 123^b. HIS, W.: Zur Casuistik des Cretinismus. *Virchow's Archiv*, Bd. xxii. S. 104—110. Berlin, 1861. [A long description of the corpse of a cretinous male individual aged 58. Constantly referred to as "His's Dwarf." A few scanty thin hairs (similar to those on an elderly woman) were on the chin and upper lip. Total length from vertex to sole 120 cm. Body and limbs were very small, neck extremely short, head very broad. The nose was very broad. The swollen eyes and lip and projecting tongue which are customary in cretins did not exist and there was no goitre. The mouth and teeth showed a peculiar admixture of senile and infantile characteristics. External genitals normally developed. Very full measurements of skull and skeleton are given. There is a plate of the skull.]
 124. SEDGWICK, WM.: On sexual limitation in hereditary disease. *British and Foreign Medico-chirurgical Review*, Vol. xxviii. p. 200. London, 1861. [This is merely a note referring to the case of Clauders: see Bibl. No. 14.]
 125. CANTON, E.: The skull, pelvis and long bones of the extremities of an aged female dwarf. *Transactions of the Pathological Society*, Vol. xii. pp. 173—176. London, 1861. [This dwarf was brought to Charing Cross Hospital. All the different parts were dwarfish but proportionate to one another, with the exception of the head, in which the dimensions of a fully and well-formed cranium obtained. No family history. Hymen intact. Height not given. Humerus, 7½ inches. Femur, 10 inches.]
 126. ECKER, ALEXANDER: Vergleichung der Körper-Proportionen zweier Personen von ungewöhnlicher Körpergrösse. Plate. *Berichte über die Verhandlungen der Gesellschaft für Beförderung der Naturwissenschaften zu Freiburg i. B.*, Bd. ii. S. 379—386. Freiburg i. B. 1861. [Full

- measurements are given of the dwarf Jacob Fischer, 1.005 m. in height, aged 19½ years, and of the giant Gottfried Sproll, aged 28, height 2.01 m.]
127. FÖRSTER, AUGUST: Die Zwergbildung, Mikrosomia, Nanosomia, S. 61—63. Verkrümmung und abnorme Kleinheit aller Extremitäten, S. 64. *Die Missbildungen*. Jena, 1861. [This gives a short general discussion on dwarfs and mentions Bébé, Boruwlaski, and Jeffrey Hudson.]
 - 127^b. VALENTA, ALOIS: Weitere Beiträge zur Catheterisatio literi. Kunstliche Frühgeburt wegen Zwergwuchses. *Wiener Medicinal Halle*, Bd. II. No. 48, S. 453—454. Wien, 1861. [A woman aged 27, scarcely "51 Wiener Zoll" in height, with limbs perfectly proportioned to her size, healthy and showing no trace of rickets, came to be confined. She had had a previous pregnancy, with premature birth, the child being very small. Premature confinement was brought on and a boy born, weight "4 Pfund," length 17" 1". Mother and son left the hospital in 3 months strong and healthy.]
 128. HUMPHRY, SIR GEORGE MURRAY: On the Influence of Paralysis, Disease of the Joints, Disease of Epiphysial Lines, Excision of the Knee, Rickets and some other morbid conditions upon the growth of the Bones. *Medico-Chirurgical Transactions*, Vol. XLV. or N.S. Vol. XXVII. pp. 283—327. London, 1862. [pp. 318—325 give a table of the measurements of several rickety skeletons; the first five he states are cases of dwarfed growth rather than rickets proper.]
 129. WELCKER, HERMANN: *Untersuchungen über Wachsthum und Bau des menschlichen Schädels*, Erster Theil, S. 33. Leipzig, 1862. [Some measurements of three dwarfs are given, (1) Pauline, neighbourhood of Berlin, age 17, stature 933 mm. "Kopfhöhe" defined thus, "vom Scheitel bis zu einer das Kinn betreffenden Horizontalen," 183 mm. (2) Jacob Fischer, Rhenish Palatinate, age 20, stature 1005 mm. "Kopfhöhe" 175 mm. (3) Admiral Piccolomini, Breslau, age 30, stature 1030 mm. "Kopfhöhe" 187 mm.]
 130. *CASTELAIN: Nain difforme. *Bulletin médical du Nord*, 2^e Série, T. IV. p. 97. Lille, 1863.
 131. HECKER, C.: Hochgradige Beckenverengerung in Folge von Rachitis Congenita complicirt mit Eclampsie und Zwillingen. Kaiserschnitt. Beide Kinder lebend. Mutter todt 40 Stunden nach der Operation. Plate. *Hecker und Buhl's Klinik der Geburtskunde*, Bd. 2, S. 73—92. Leipzig, 1864. [Pedigree No. 823.]
 132. SWAYNE, J. G.: Case of Caesarian Operation. Plate. *Transactions of the Obstetrical Society*, Vol. V. pp. 84—93. London, 1864. [A female achondroplastic (?) dwarf, age 42, height 4 ft. and ½ inch, came to be confined at full term. Caesarian section was performed, the mother died, the child, a male of average size, lived. She had previously had a miscarriage in the 2nd month.]
 133. ENDER: Kaiserschnitt mit glücklichem Ausgange für Mutter und Kind. *Monatsschrift für Geburtskunde und Frauenkrankheiten*, Bd. XXV. S. 43—50. Berlin, 1865. [Pedigree No. 815.]
 - 133^b. VERARDINI, FERDINANDO: Rapporto dell' esame fatto dalla commissione composta dei Soc. Rizzoli, Versari, Brugnoli, Romei, Modonini e Verardini stesso, sui tre fratelli Magri di Pieve di Cento. *Bullettino delle Scienze Mediche della Società Medico-Chirurgica di Bologna*, Serie 4^a, Vol. 24, pp. 270—273. Bologna, 1865. [Gives an account with measurements of the three dwarfs in the Magri family and states that Veratti's paper gives other details: see Bibl. No. 116^b.]
 134. BIDDER, ERNST: Eine Osteogenesis imperfecta. Beitrag zur Lehre von den fötalen Knochenerkrankungen. *Monatsschrift für Geburtskunde und Frauenkrankheiten*, Bd. XXVIII. S. 136—153. Berlin, 1866. [Description of a female infant in the Würzburg pathological anatomical Collection with extremely short extremities. Total length of skeleton 27 cm.]
 135. SCHARLAU: Congenitale Rachitis. *Monatsschrift für Geburtskunde und Frauenkrankheiten*, Bd. XXX. S. 63, u. S. 400—414. Berlin, 1867. [Pedigrees Nos. 628 and 646.]
 136. SCHAAFFHAUSEN, H.: Die Sektion eines in Coblenz gestorbenen Zwerges von 61 Jahren. Sitzungsberichte der nieder-rheinischen Gesellschaft für Natur- und Heilkunde zu Bonn, S. 26—27. *Verhandlungen des natur-historischen Vereines der preussischen Rheinlande und Westphalens*, 25 Jahrgang. Bonn, 1868. Also S. 10—11, 39 Jahrgang. Bonn, 1882. [Pedigree No. 705 (Family Lehnen¹).]
 137. ZAGORSKI, ADAM. Beiträge zur Kaiserschnitte. *Monatsschrift für Geburtskunde und Frauenkrankheiten*, Bd. XXXI. S. 44—67. Berlin, 1868. [Pedigree No. 723.]
 138. WOOD, EDWARD J.: *Giants and Dwarfs*, pp. 236—446. London, 1868. [Short accounts of many dwarfs. Pedigrees Nos. 710, 712 and 716 (Calvin Philips, Robert Skinner, "The Dwarf of the World").]
 139. HUMPHRY, SIR GEORGE MURRAY: On the skeleton of a rickety dwarf. *Journal of Anatomy and Physiology*, Vol. II. pp. 42—46. Cambridge and London, 1868. [Description and plate of the skeleton of a female dwarf in Cambridge Anatomical Museum. Said to be the skeleton of

¹ Note the occurrence of the same name as that of the painter Jacob Lehnen: see p. 359 and Iconog. No. 85.

- a Paris beggar who died aged 85. Height 32·5 inches. Judging from the plate, it is a case of true rickets and not achondroplasia or ateleiosis.]
140. DOWN, LANGDON: Case of arrested development. *Transactions of the Pathological Society*, Vol. xx. pp. 419—420. London, 1869. [Pedigree No. 835.]
 141. VON FRANQUÉ, OTTO: Funf Fälle von Einleitung der künstlichen Frühgeburt. *Scanzone's Beiträge zur Geburtskunde und Gynaekologie*, Bd. vi. S. 109—124. Würzburg, 1869. [Pedigree No. 757.]
 142. *ROOF, F. A.: Lack of Osseous Development. *Philadelphia Medical and Surgical Reporter*, Oct. 16, 1869. Philadelphia, 1869. [An account is given of a female dwarf aged 21, whose height was 33 inches at age of 12 or 15, breasts small but had menstruated regularly for 3 years. There was no dwarfism in the family, but several of her maternal relatives had hare-lip. Original not seen but quoted from *Virchow und Hirsch's Jahresbericht*, Jahrg. iv. Bd. i. S. 178. Berlin, 1870.]
 143. WINKLER, N. F.: Ein Fall von foetaler Rachitis mit Mikromelie. *Archiv für Gynaekologie*, Bd. ii. S. 101—110. Berlin, 1871. [Pedigree No. 653.]
 - 143^b. *ENGEL: Das rachitische Becken. *Wiener medizinische Wochenschrift*, Jahrgang 1872, S. 40. Wien, 1872.
 144. URTEL, H.: *Ueber Rachitis Congenita*. Inaug. Diss. Halle, 1873. [Discusses various cases and gives a description of a case of his own, a foetus with short extremities, length, 44 cm.]
 145. KEHRER, F. A.: Zur Entwicklungsgeschichte des rachitischen Becken. *Archiv für Gynaekologie*, Bd. v. S. 55—59. Berlin, 1873. [Pedigree No. 772.]
 146. ADAMS, W.: Foetus with arrested development. *Transactions of the Pathological Society*, Vol. 24, pp. 263—264. London, 1873. [Pedigree No. 818.]
 147. *KLEBS, E.: Beobachtungen und Versuche über Cretinismus, i. und ii. *Archiv für experimentelle Pathologie und Pharmakologie*, Bd. ii. S. 72. Leipzig, 1874.
 148. SCHWEINFURTH, GEORG: *Im Herzen von Africa*, Theil ii. Kap. 16, S. 131—135. Leipzig and London, 1874. [Gives an account of the Akkas, a pygmy race in Africa: see p. 356 *supra*.]
 149. BISKAMP, ALBERT: *Ein Fall von fötaler Rachitis*. Inaug. Diss. Marburg, 1874. [This dissertation discusses cases described by other authors, more particularly Urtel's Case, and describes a new case, a male infant who died during birth. He was the first-born child of a healthy mother aged 42, weighed 2515 grammes and measured 42 cm. He had short thick extremities. A plate of the child is given.]
 150. TELKE, OSCAR: *Experimentelle Beiträge zur Lehre von Knochenwachsthum*. Inaug. Diss. Greifswald, 1874. [Gives an account of his experiments on rabbits made for the purpose of studying the growth of bones.]
 151. ENGLISCH, JOSEF: Ein Fall von Rachitis foetalis. *Oesterreichisches Jahrbuch für Paediatrik*, Jahrgang v. Bd. i. S. 165—176. Wien, 1874. [Description and measurements of a still-born child from a healthy mother, whose parents and siblings were healthy. The extremities were very much curved and short, probably a case of achondroplasia.]
 152. BRODOWSKI, P.: Zwei Zwerge. Sitzung der Warsch. ärztlichen Gesellschaft. *Medycyna*, No. 42, quoted in *Virchow und Hirsch's Jahresbericht über die Leistungen und Fortschritte in der Gesamten Medicin*, Jahrgang ix. Bd. i. p. 300. Bericht für das Jahr 1874. Berlin, 1875. [Pedigree No. 822.]
 153. FISCHER, A.: Ueber einen Fall von Rachitis Congenita. *Archiv für Gynaekologie*, Bd. vii. S. 46—48. Berlin, 1875. [Pedigree No. 809.]
 154. GRAFE, RUDOLPH: Zwei fötal-rachitische Becken. *Archiv für Gynaekologie*, Bd. viii. S. 500—513. Berlin, 1875. [Description of two achondroplastic (?) foetuses, one male and one female, with measurements of head and pelvis. No family history.]
 155. EPPINGER, HANS: Mittheilungen aus dem pathologisch-anatomischen Institut zu Prag. *Vierteljahrsschrift für die praktische Heilkunde*, Bd. 126, S. 35—38. Prag u. Leipzig, 1875. [Merely a description of Klebs' Case, a female infant with short extremities, length 43·5 cm. See Bibl. No. 147.]
 156. KRAUSE, F.: *Beschreibung des Skelets einer 29 jährigen Zwergin, mit besonderer Berücksichtigung des Beckens*. Inaug. Diss. Freiburg i. B. 1875. [Full measurements of the skeleton of a well-proportioned female dwarf are given. Height 120 cm. Caesarian section was performed and a male infant extracted. Weight 7 "Pfund," length 53 cm. The mother died; it is not stated whether the child lived or not. No family history.]
 157. MORENO, FERNANDEZ: Observación curiosa. *El Siglo Medico*, T. xxii. pp. 157—158, 173—174, 204—205. Madrid, 1875. [Pedigree No. 729.]

158. *DE ANTELO, JOSÉ: Duos Enanos. *Revista de Antropologia*, 1875, T. II. Madrid, 1875 or 1876. [This is quoted by Taruffi, Bibl. No. 248, and from his description it must be the same case as that described by Moreno, Bibl. No. 157.]
159. LANCEREUX, E.: Nanisme et Géantisme. *Traité d'Anatomie pathologique*, pp. 179—180. Paris, 1875—1877. [A short article on dwarfism, containing nothing of special value.]
160. HOESS, FRANZ: *Ueber Rachitis foetalis*. Inaug. Diss. Marburg, 1876. [A discussion on several well-known cases—Scharlau's, Gurlt's, Winkler's, etc., with description of a new case, a female infant, the first-born child of healthy parents. The heart beat for 10 minutes after birth. Weight 2060 grammes, length 39.5 cm. Other measurements are given. The mother was aged 23.]
161. PARROT, J.: Les lésions osseuses de la syphilis héréditaire et du rachitis. *Archives de Physiologie*, T. VIII. pp. 133—139. Paris, 1876. [On the relations of syphilis to rachitis.]
162. CHARPENTIER: Rétrécissement du bassin chez une femme d'une taille 1.15 m. etc. *Archives de Tocologie des maladies des femmes et des enfants nouveaux-nés*, 3^e Année, pp. 45—54. Paris, 1876. [Pedigree No. 647.]
163. LOHLEIN, HERMANN: Zur Lehre vom durchweg zu engen Becken. *Zeitschrift für Geburtshilfe und Frauenkrankheiten*, Bd. I. S. 37—65. Stuttgart, 1876. [Pedigree No. 741.]
164. DE ROCHAS, V.: Article: Nanisme. *Dictionnaire des Sciences Médicales*, 2^e Série, T. II. pp. 586—591. Paris, 1876. [On dwarfs in general.]
- 164^b. *ZOSI, IPPOLITO: *Lettera inedita in risposta al Prof. Taruffi*, 4 Novembre, 1877 (? published).
165. DEPAUL, J. A. H.: Sur une maladie spéciale du système osseux, développée pendant la vie intra-utérine, et qui est généralement décrite, à tort selon moi, sous le nom de rachitisme. *Archives de Tocologie des maladies des femmes et des enfants nouveaux-nés*, 4^e Année, pp. 641—650. Paris, 1877. Also 5^e Année, pp. 1—8, 321—332, 424—431, 449—457. Paris, 1878. [Pedigree No. 795: see also Bibl. No. 100.]
166. TOWNSEND, E. R.: Case of difficult labour in a dwarf, complicated with convulsions, delivered by the cephalotribe. *The Dublin Journal of Medical Science*, Vol. 64, pp. 90—92. Dublin, 1877. [Pedigree No. 764.]
167. BORINTRAGER, J. B.: *Ueber fotale Rachitis; im Anschluss an einen Fall aus der Königsberger geburtshilflichen Klinik*. Inaug. Diss. Königsberg, 1877. [A general discussion of foetal rachitis with special reference to small pelves and to the position of rachitic children in the womb. Description of a female infant, length 34 cm., with small head and short thick extremities, is given. The body was covered with lanugo. She was the second child of a Polish woman.]
168. *TARUFFI, CESARE: Della Microsomia. Nota 5. *Rivista Clinica di Bologna*, 2^a s. T. 8. 122 pages. Bologna, 1878. [This paper gives the pedigree of the Magri family, then first described by Taruffi. Pedigree No. 690: see Bibl. Nos. 116^b and 133^b.]
169. BROCA, P. P.: Nain Rachitique. *Bulletins de la Société d'Anthropologie de Paris*, 2^e Série, T. XII. Année 1877, p. 448. Paris, 1878. [Broca exhibited a rachitic dwarf, aged 63. The size of his head was above the average. His extremities were short but not curved. Height 114 cm. He was intelligent and enjoyed robust health.]
170. Article: The Marriage of Dwarfs. *Hospital Gazette*, Vol. IV. p. 81. New York, 1878.
171. MÜLLER, ADOLF: Rachitic fœtus. *Aerztliches Intelligenzblatt*, Jahrgang 25, S. 309. München, 1878. [Description of a still-born rachitic infant, with very short extremities. It was the second child of its mother, the first suffered from ordinary rachitis. No measurements.]
172. PARROT, J.: Sur les malformations achondroplasiques et le Dieu Phtah. *Bulletins de la Société d'Anthropologie de Paris*, 3^e Série, T. I. pp. 296—302. Paris, 1878. See also *Recueil de Travaux relatifs à la Philol. et l'Archéol. Égyptiennes et Assyriennes*, Année II. pp. 129—130. Paris, 1880. [Measurements and description of a female achondroplastic dwarf aged 7½, height 93 cm., are given on p. 299.]
173. EBERTH, C. J.: *Die foetale Rachitis und ihre Beziehungen zu dem Kretinismus*. Leipzig, 1878. Also *Correspondenz-Blatt für Schweizer Aerzte*, Jahrgang IX. S. 465—466. Basel, 1879. [He divides the subject into four parts. I. Foetale Rachitis bei Menschen. II. Foetale Rachitis bei Thieren. III. Rachitis und foetale Rachitis. IV. Rachitis und Kretinismus.]
174. RAWDON, H. G.: Case of dwarfed growth associated with idiocy and congenital tonic contraction of the spine and limbs. *British Medical Journal*, 1879, Vol. I. p. 386. London, 1879. [Boy, aged 8½, height 28—29 inches; he was a twin; the other twin, parents and other siblings were normal.]

175. *KASSOWITZ, M.: Die normale Ossification und die Erkrankungen des Knochensystems bei Rachitis und hereditären Syphilis. *Wiener Medicinische Jahrbücher*, S. 145—224 and 293—457, Tafel VIII. xvi. 8. Wien, 1879. [See Bibl. No. 217.]
176. *KASSOWITZ, M.: Knochenbildung und Knochenresorption. *Wiener Medicinische Blätter*, II. Jahrgang, Nos. 44, 45, 46, 47. Wien, 1879.
177. *PLA, E. F.: Caso de enanismo observando en la raza negra. *Bol. Soc. Antrop. de Cuba*, T. 1. pp. 88—91. Habana, 1879—1886.
178. KINGSLEY, NORMAN W.: *A Treatise on Oral Deformities*, pp. 18—19. New York, 1880. [Some remarks on the teeth of dwarfs.]
179. SMITH, MARY A.: Ueber Rachitis foetalis. 2 Tafeln. *Jahrbuch für Kinderheilkunde*, Bd. xv. S. 79—122. Leipzig, 1880. [Gives some account of the literature on the subject and a case of her own. Pedigree No. 805.]
180. *SMITH, MARY A.: *Beiträge zur Lehre der foetalen Rachitis*. Inaug. Diss. Zürich, 1880.
181. PARROT, J.: La syphilis héréditaire et le rachitisme. *Le Progrès Médical*, T. VIII. pp. 623—625, 679—680, 759—762. Paris, 1880. [Chiefly about syphilis, no special cases of rachitis.]
182. WALTHER, HUGO: *Beschreibung eines durchweg zu kleinen weiblichen Skeletes mit besonderer Berücksichtigung des allgemein gleichmässig verengten Beckens*. Inaug. Diss. Freiburg i. B. 1880. [This paper gives some account of the literature on narrow pelvis and "pelvis nana," and gives full description and measurements of a well-proportioned female dwarf aged 30, height 128 cm., on whom Caesarian section was performed. The child, a male, weight 4½ "Pfund," lived, the mother died. No family history.]
183. *GUÉRIN, J.: *Recherches sur les difformités congénitales, chez les monstres, le fœtus et l'enfant*. Paris, 1880.
184. TOPINARD, PAUL: Géants et Nain à Londres. *Revue d'Anthropologie*, T. III. p. 570. Paris, 1880. [Refers to a notice in the *London Times* (no date given) of the dwarf Chomach, aged 42, height 63 cm. He appears to have been a Chinese.]
185. LARREY: Notes sur un cas de nanisme. *Bulletins de l'Académie de Médecine*, 2^e Série, T. x. pp. 1216—1218. Paris, 1881. [This is the same case as Magitot's: see Bibl. No. 186.]
186. MAGITOT, E.: Étude anthropologique sur un nouveau cas de nanisme. *Gazette hebdomadaire de Médecine et de Chirurgie*, 2^e Série, T. XVIII. No. 43, pp. 692—694. Paris, 1881. [Pedigree No. 722.]
187. DE QUATREFAGES DE BREAU, J. L. A.: Sur Balthazar Zimmermann, dit le prince Balthazar, véritable nain microcéphale. *Bulletins de la Société d'Anthropologie de Paris*, 3^e Série, T. IV. pp. 702—708. Paris, 1881. [See Bibl. No. 232, Pedigree No. 765 and Plate JJ (71^a).]
188. *DE QUATREFAGES DE BREAU, J. L. A.: *Pygmées anciens et la science moderne*. Paris, 1881—1882.
189. DE QUATREFAGES DE BREAU, J. L. A.: Les Pygmées d'Homère, d'Aristote, de Plin d'après les découvertes modernes. *Journal des Savants*, Année 1881, pp. 94—107. Paris, 1881. [This is only "Premier Article," "Les Pygmées d'Homère": he states he will continue it later. Title explains subject. ? Same as No. 188.]
190. BORELLI, DIODATO: Ueber unvollkommene Entwicklung der Geschlechtsorgane. *Verhandlungen der physikalisch-medicinischen Gesellschaft zu Würzburg*, N. F. Bd. xv. S. 84—92. Würzburg, 1881. [Treats of the effect of malaria on growth and gives the measurements of three boys, two of whom were brothers.]
191. NEUMANN, GEORG: Ueber fötale Rachitis und ihre Beziehungen zum Cretinismus. Inaug. Diss. Halle, 1881. [He describes Virchow's Case (*Virchow's Archiv*, Bd. v., 1853) fully and discusses H. Muller's article (Bibl. No. 120) and cases of other writers. Two foetuses examined by himself are described, (1) a female infant prematurely born with short limbs, (2) a male foetus, length 30.5 cm., which he says closely resembled Case (1). No family history.]
192. BARLOW, SIR THOS.: A case of so-called foetal Rickets. *Transactions of the Pathological Society*, Vol. XXXII. pp. 364—367. London, 1881. [In this case the limbs were stunted and the neck short and thick. No family history except that a previous child had been born with turned-in feet.]
193. SHATTOCK, SAMUEL G.: Some Cases of osseous lesions in the Foetus. *Transactions of the Pathological Society*, Vol. XXXII. pp. 369—379. London, 1881. [Two cases, one a female, one unsexed, of which full measurements are given. No family histories.]
194. SPIEGELBERG, O.: Rachitis, S. 332—334. Zwergbecken, S. 409. *Lehrbuch der Geburtshülfe*. Lehr, 1882. [A general account of rachitic and dwarf pelvis.]

195. SCHAAFFHAUSEN, H. 1882. See No. 136.
196. VIRCHOW, RUDOLF: Zwergenkind. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie, und Urgeschichte. *Zeitschrift für Ethnologie*, Bd. 14, S. 215. Berlin, 1882. [Account of Princess Paulina. Pedigree No. 728: see Bibl. Nos. 129, 214, 215 and 322.]
197. RUMPE, R.: *Ueber foetale Rachitis*. Inaug. Diss. Marburg, 1882. [A discussion of various cases described by other writers, with a description and plate of a still-born male infant, weight 3000 grammes, length 38 cm., with short extremities. He was the third child of a 25-year-old mother.]
198. BERTILLON, JACQUES: Un Nain Russe. *La Nature*, T. xxii. p. 13. Paris, 1883—1884. [A Russian dwarf, Wassilievitch by name, aged 51, height 1 metre. He was first described by Benzenger (it does not give reference) who presented the photograph which is reproduced, to the Société d'Anthropologie de Paris. He was the youngest of a family of six siblings, all of normal build and healthy. His mother nearly killed him in her efforts to make him grow and keep him warm. He had a wrinkled, beardless face, was quite intelligent although he had had little or no education. He was unmarried. M. Lunier thought his dwarfism might be the result of cretinism, but he had no goitre. The picture represents him standing beside an adult male and apparently he was not achondroplastic: see our Plate KK (76).]
199. VIRCHOW, RUDOLF: Foetale Rachitis, Cretinismus, und Zwergwuchs. *Virchow's Archiv*, Bd. xciv. S. 183—184. Berlin, 1883. [A few notes on the different symptoms of rachitis, cretinism, etc.]
200. VIRCHOW, RUDOLF: Amerikanischer Zwerg. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. *Zeitschrift für Ethnologie*, Bd. xv. S. 300. Berlin, 1883. [Account of the dwarf Francis G. Flynn, aged 19, height 80·7 cm. Pedigree No. 740.]
201. LANGE: Entbindung einer rachitischen Zwergin. *Berliner klinische Wochenschrift*, 1883, No. 49, xx. Jahrgang, S. 753—755. Berlin, 1883. [Pedigree No. 648.]
202. GUÉNIOT: Rachitisme congénital développé et guéri avant la naissance. *Bulletins et Mémoires de la Société de Chirurgie*, T. ix. pp. 553—556. Paris, 1883. [Description of a new-born infant. No family history or measurements.]
203. BODE, EMIL: Ueber sogenannte foetale Rachitis. *Virchow's Archiv*, Bd. xciii. S. 421—442. Berlin, 1883. [Pedigree No. 769.]
204. *PASSERINI, A.: Un caso di microsomia con normale sviluppo delle facoltà psichiche. *Indipendente*, T. xxxiv. pp. 481—484. Torino, 1883.
205. GARNIER, EDOUARD: *Les Nains et les Géants*. Paris, 1884. [Gives accounts of many historical dwarfs. Pedigree No. 719 (Lucia Zazate).]
206. FÜRST, LIVIUS: Exquisite Wachsthumshemmung bei Hydrocephalus Chronicus. *Virchow's Archiv*, Bd. xcvi. S. 363—365. Berlin, 1884. [A female hydrocephalic dwarf aged 13½ years, height 81 cm. No family history.]
207. BOLLINGER, OTTO: Ueber Zwerg- und Riesenwuchs. *Virchow's und Holtzendorff's Sammlung gemeinverständlicher wissenschaftlicher Vorträge*, Serie xix. Heft 455, S. 1—20. Berlin, 1884. [General observations on dwarf growth.]
208. BOWLBY, A. A.: Four cases of sporadic cretinism, with remarks on some points of the pathology of the disease. *Transactions of the Pathological Society*, Vol. xxxv. pp. 450—464. London, 1884. [A description of four foetuses which are in the Museum of St Bartholomew's Hospital, and were classed as cases of foetal rickets; Bowlby considers them to be cases of sporadic cretinism. All four specimens have very short extremities.]
209. TARUFFI, CESARE: Storia di un caso di pseudo-rachite fetale. *Memorie della R. Accademia delle Scienze dell' Istituto di Bologna*, Serie iv. T. vi. pp. 661—676. Bologna, 1884. [Pedigree No. 750.]
210. BARLOW, SIR THOS.: Limb-bones, skull and brain of a case of so-called foetal rickets (? foetal cretinism). *Transactions of the Pathological Society*, Vol. xxxv. pp. 459—464. London, 1884. [Pedigree No. 807.]
211. SUTTON, J. B.: A foetal Cretin. *Transactions of the Pathological Society*, Vol. xxxv. pp. 464—465. London, 1884. [A female foetus, with short limbs. Height 20 inches, length of legs 4½ inches.]
212. GRÜNDLER, R.: Zur Cachexia Strumipriva. *von Bruns' Mittheilungen aus der chirurgischen Klinik zu Tübingen*, Bd. i. S. 420—451. Tübingen, 1884. [A paper on the extirpation of goitre and of the thyroid gland.]
213. *GUÉNIOT: Rachitisme développé et guéri avant la naissance. *Revue Mensuelle des Maladies de l'Enfance*. Paris, 1884. [= No. 202.]

214. BOUCHARD, A.: Du nanisme (à propos de la naine dite Princesse Paulina). *Journal de Médecine de Bordeaux*, Année xiv. pp. 276—279. Bordeaux, 1884—1885. [Account of Pauline Musters, with a letter from Dr L. van der Moolen giving particulars of her birth. Then follows a discussion of the possible causes of dwarfism. Pedigree No. 728: see Bibl. Nos. 129, 196, 215 and 322.]
215. DE MORTILLET, ADRIEN: La Princesse Paulina. *Bulletins de la Société d'Anthropologie de Paris*, 3^e Série, Tome VIII. p. 446. Paris, 1885. [See Bibl. Nos. 129, 196, 214 and 322.]
216. RANKE, H., UND VOIT, CARL: Ueber den amerikanischen Zwerg Frank Flynn, genannt General Mite, dessen Körper- und Geistesentwicklung und Nahrungsbedarf. *Archiv für Anthropologie*, Bd. xvi. S. 229—239. Braunschweig, 1885. [Pedigree No. 740.]
217. KASSOWITZ, MAX: *Die normale Ossification und die Erkrankungen des Knochensystems bei Rachitis und hereditären Syphilis*, Bd. II. S. 35—50. Wien, 1885. [A discussion on congenital Rachitis. See also Bibl. 175.]
218. MARCHAND, F. J.: Ueber die Synostose d. Schädelbasis bei sogenannter foetaler Rachitis. *Tageblatt der 58. Naturforschenden Sammlung zu Strassburg*, S. 422—423. Strassburg, 1885. [Discusses Grawitz's Case (Bibl. No. 219) and gives a short description of a child, but no measurements or family history.]
219. GRAWITZ, P.: Ein Fetus mit cretinistischer Wachstumsstörung des Schädels und der Skelettknochen. *Virchow's Archiv*, Bd. c. S. 256—262. Berlin, 1885. [Description of a female achondroplastic(?) foetus. No family history.]
220. EHRLICH, N.: Untersuchungen über die congenitalen Defecte und Hemmungsbilden der Extremitäten. *Virchow's Archiv*, Bd. c. S. 107—138. Berlin, 1885. [S. 116—119 describe a foetus 39 cm. in length with abnormally short limbs.]
221. VON FERRO, R.: Ueber einen Fall von Rachitis congenita. *Wiener medizinische Presse*, Jahrgang xxvi. S. 374—375. Wien, 1885. [Case of a boy born at term, either still-born, or died after birth. No measurements but those of the skull given. The parents were healthy and had a healthy child aged 2½ years.]
222. ROHRER, F.: Ein Fall von Zwerghaftigkeit als Beitrag zur Aetiologie der Wachstumsstörung. *Virchow's Archiv*, Bd. ci. S. 197. Berlin, 1885. [Pedigree No. 827.]
223. SCHILDOWSKY, EMIL: *Ueber sogenannte fötale Rachitis*. Inaug. Diss. Erlangen, 1884. [A general discussion of the subject with description of a still-born child, length 37 cm., with very short thick curved extremities. It had been described as a "new-born cretin" and was the tenth child of a mother suspected of syphilis all whose children had either been still-born or had died shortly after birth.]
224. MOREAU, PAUL: *Fous et Bouffons*. Paris, 1885. [pp. 15—27, Rachitisme. pp. 48—50, Crétinisme. pp. 65—145, Nains. pp. 68—72, Nains dans l'antiquité. pp. 72—84, Peuples Nains de l'Afrique. pp. 84—92, Les véritables nains... mention: Gibson, Anne Shepherd, Lolkes, Tom Thumb, Lavinia Warren, Bébé. pp. 93—96, Fabrication des nains. pp. 96—119, Court Dwarfs under various courts. pp. 119—140, Bébé, Boruwlaski, Tom Thumb, General Mite, Millie Edwards, Prince and Princess Colibri, etc. pp. 140—145, Nains en Orient.]
225. DYES, A.: *Beschreibung eines Falles von Pelvis nana mit kindlichen Habitus bei einer zeugungsfähigen Zwergin*. Inaug. Diss. Freiburg, 1885. [A general account of "Pelvis nana" is given, followed by a description of his case. See Pedigree No. 771.]
226. BRANDT, ALEXANDER: Ein extremer Fall rachitischer Verkrüppelung. *Virchow's Archiv*, Bd. civ. S. 540—548. Berlin, 1886. [Description of a female aged from 50 to 60. Length of trunk 57 cm. Length of lower extremities 49 cm. No family history.]
227. ARENDES, ADOLF: *Ueber Zwergebildung*. Inaug. Diss. Georg-August Universität zu Göttingen. Göttingen, 1886. [Probably rickety dwarfs. Pedigree No. 814.]
228. FOURNIER, ALFRED: *La syphilis héréditaire tardive*, pp. 25—32. Paris, 1886. [Discusses the effect of "hereditary" syphilis on growth: several cases are given. No family history.]
229. TARUFFI, CESARE: Storia di un caso di pseudo-rachite fetale. *Bullettino delle scienze mediche della Società Medico-Chirurgica di Bologna*, Anno 57, Serie 6^a, T. xvii. pp. 211—212. Bologna, 1886. [Description of a new-born infant which died just after birth with short curved badly formed limbs and many other anomalies. No family history is given, but it is probably the same case as is reported in Bibl. No. 209.]
230. HUTCHINSON, SIR JONATHAN: Congenital absence of hair and mammary glands with atrophic condition of the skin and its appendages in a boy whose mother had been almost wholly bald from alopecia areata from the age of six. *Medico-Chirurgical Transactions*, Vol. Lxix. pp. 474—477. London, 1886. [This is same case as is described in Bibl. No. 311.]

231. DAUBÉS, GUYOT: Les Nains et les Géants, les variations de la stature humaine. *La Nature*, T. xxviii. pp. 18—22, 193—194, 242—244, 262—263. Paris, 1886—1887. [A series of short papers on variations in the human stature and of causes which influence them. The papers appear to be unimportant and of little scientific value.]
232. BRONGIART, CHAS.: Une famille de Nains. *La Nature*, T. xxix. pp. 179—182. Paris, 1887. [p. 180 gives a picture of Balthazar Zimmermann described by Quatrefages, Bibl. No. 187, who from the cut does not appear to be achondroplastic¹: see our Plate JJ (71^a). p. 181 gives a picture of the dwarf family Kotesky, Pedigree No. 744: see our Plate KK (75).]
- 232^b. KLEBS, EDWIN. Vererbte hereditäre Krankheitsanlagen. *Die Allgemeine Pathologie oder die Lehre von den Ursachen und den Wesen der Krankheitsprocesse*, Theil i. Kap. iii. p. 28. Jena, 1887. [Only a few remarks on the heredity of dwarfism, with a reference to Veratti's and Luigi Frank's dwarf pedigrees: see Bibl. Nos. 67 and 116^b.]
233. *SABUDINI: *Alger Médical*, Mai—Juin 1887. [According to Regnault, Bibl. No. 411, Sabudini reported the case of a rachitic dwarf to the Société Médicale d'Algers. She was enceinte and he used the cephalotribe. Regnault reproduces a picture of this dwarf and says she was achondroplastic.]
234. DE QUATREFAGES DE BREAU, J. L. A.: *Les Pygmées*. Paris, 1887. [On pygmies in general.]
235. LAURO, VINCENZO: Della rachitide nella vita endouterina. *Annali di Ostetricia e Ginecologia*, Anno ix. pp. 385—429. Milano, 1887. [Pedigree No. 617.]
236. STORP, JOH.: *Untersuchungen über fötale Rachitis*. Plate. Inaug. Diss. Königsberg, 1887. [A recapitulation of cases described by other authors followed by measurements, autopsy and microscopical examination of two new cases. (1) A still-born female infant, tenth child of a healthy mother aged 42. Three of the children had died young, six were alive and healthy. The father had suffered from catarrh of the stomach. Length of infant 40·5 cm., weight 2600 grammes. The extremities were remarkably short and thick. (2) An illegitimate female infant, who died half an hour after birth. The mother, aged 24, had been sickly in youth and had had a previous child who died, aged 6 months, of atrophy. The infant weighed 2850 grammes, length 38·5 cm., and closely resembled Case (1) in appearance.]
237. DOUTREBENTE ET MANOUVRIER, L.: Le cerveau, le crâne, etc., d'un nain rachitique et aliéné. *Comptes Rendus de l'Association française pour l'Avancement de Science*, T. xvii. 2^e Pt, pp. 405—412. Paris, 1888. [This paper is mainly a description of the brain and skull of a dwarf, Mazar by name. He was rachitic, born in Paris, stature 133 cm. In youth he had been a porcelain painter; he died insane aged 71. The left femur was curiously deformed. The neck of the femur not having been able to support the weight of the body, the head of the femur was 4 cm. below the lower edge of the great trochanter. There is no family history except that his father was also insane.]
238. KIRCHBERG, ADOLF: Ueber einen Fall von sogenannter fötaler-Rachitis mit doppelseitiger Hüftgelenk-Subluxation. Inaug. Diss. Marburg, 1888. [A long and minute description is given of a new-born female infant with short body and very short thick extremities. The total length was 31·5 cm. The child had a cleft palate and bilateral dislocation of the hip joint. She was the first-born child of healthy parents. A short general discussion of the subject follows.]
239. QUISLING, N. A.: Studien über Rachitis. *Archiv für Kinderheilkunde*, Bd. ix. S. 293—355. Stuttgart, 1888. [p. 296 is on congenital rachitis.]
240. BARNUM, P. T.: *Life of P. T. Barnum*, pp. 70—79, 213, and 217—228. Buffalo, 1888. [Gives accounts of Mr and Mrs Tom Thumb, and Commodore Nutt.]
241. CARUSO, FRANCESCO: Die neuesten Ergebnisse des conservativen Kaiserschnittes mit Uterusnaht (nach Sanger's Methode und anderen Nahtverfahren). *Archiv für Gynäkologie*, Bd. xxxiii. S. 211—269. Berlin, 1888. [p. 219 gives a case of Zweifel's, who allowed Caruso to publish it. Pedigree 840.]
242. HUTCHINSON, SIR JONATHAN: An account of the skeleton of the Norwich Dwarf. Plates. *Transactions of the Pathological Society*, Vol. xl. pp. 229—235. London, 1889. [This dwarf was executed for the murder of his child and attempted murder of his wife. He was aged 35, height 4 feet 2 inches. His legs and arms were short, all the larger bones of his limbs being thick and remarkably short, but not curved in any way. Measurements are given. Pedigree No. 635.]

¹ Regnault (Bibl. No. 411) states on the basis of this picture that Zimmermann was myxoedematous.

243. KIRCHBERG, ADOLF, UND MARCHAND, FELIX: Ueber die sogenannte fotale Rachitis (Mikromelia chondromalacia). *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Bd. v. S. 183—216. Jena, 1889. [Pedigree No. 629.]
244. CRIMAIL, A.: Opération Césarienne. *Annales de Gynécologie*, T. xxxi. pp. 272—279. Paris, 1889. [Pedigree No. 633.]
245. STILLING, H.: Osteogenesis Imperfecta. Ein Beitrag zur Lehre der sogenannten foetalen Rachitis. *Virchow's Archiv*, Bd. cxv. S. 357—370. Berlin, 1889. [Pedigree No. 766.]
246. CHARCOT, JEAN MARTIN, ET RICHER, PAUL: Les Nains, les Bouffons et les Idiots. *Les difformes et les malades dans l'art*, pp. 12—51. Paris, 1889. [This gives reproductions of various statues and pictures of dwarfs, which are in the Museums and Picture Galleries of Europe and Egypt, and also information about pictures which are not reproduced.]
247. PORAK, C.: De l'achondroplasie. *Nouvelles Archives d'Obstétrique et de Gynécologie*, T. iv. pp. 551—573. Paris, 1889. Also T. v. pp. 19—31, 60—68, 133—141, 223—233, 303—307, 380—387, 421—439. Paris, 1890. [General account with Pedigrees Nos. 650 and 685.]
248. TARUFFI, CESARE: Microsomia. *Storia della Teratologia*, T. v. Cap. iii. pp. 432—472. Bologna, 1889. [Gives a bibliography of the literature on dwarfs, with short account of what each paper contains. Pedigrees Nos. 746 and 749.]
249. SCHAUTA, FRIEDRICH: Die Beckenanomalien. *P. Müller's Handbuch der Geburtshülfe*, Bd. ii. S. 221—496. Stuttgart, 1889. [pp. 289—291 give pelvic measurements of Katharina Merglas, a cowherd aged 37. She was a well-formed dwarf 107 cm. in height. Her skeleton is in the Pathological Anatomical Institute at Prague.]
250. BLAU, OTTO: Ueber sogenannte fötale Rhachitis. Inaug. Diss. Berlin, 1889. [There is a short general discussion of the subject and two cases are described. (1) Second illegitimate child of a small strongly built woman. The first child had died of teething convulsions. Her second child, a male, had short curved extremities. Total length 43 cm., weight 2300 grammes. (2) Third child of a healthy mother and weakly father, who as a child had begun to walk late. Their first child had walked later than normal children, and the second, aged 14 months, could not walk alone. The third child, a girl, died at birth. Her length was 38 cm. and weight 2160 grammes. She had very short curved extremities.]
251. KASSOWITZ, MAX: Zur Theorie der Rachitis. *Wiener medicinische Wochenschrift*, 39 Jahrgang, S. 1024—1027, 1080—1084, 1156—1159, 1197—1201, 1305—1308, 1343—1345, 1371—1374, 1401—1405, 1439—1442. Wien, 1889. [On rachitis in general.]
252. *PORAK, C.: Le crâne de Nicolas Ferry si connu sous le nom de Bébé, nain du roi de Pologne. *Bulletins et Mémoires de la Société d'Obstétrique et de Gynécologie de Paris*, 1890, p. 77. Paris, 1890.
253. PORAK, C.: De l'achondroplasie. Clermont, 1890. [This is an offprint of No. 247.]
254. BALDWIN, J. E.: A case of Porro-Caesarian operation. *Medical News*, Vol. lvii. pp. 138—141. Philadelphia, 1890. [Pedigree No. 621.]
255. FAYERABEND, E.: Ueber das Vorkommen der Rachitis bei Neugeborenen. Inaug. Diss. Königsberg, 1890. [Discussion on the frequency and cause of rachitis in new-born children, with tables giving data of 180 children who were examined and some particulars about their mothers.]
256. VON RECKLINGHAUSEN: Ergebnisse der Section eines 18-jährigen Zwerges. Naturwissenschaftlich-Medicinischer Verein in Strassburg i. E. Sitzung am 13. Juni, 1890. *Deutsche medicinische Wochenschrift*, 16 Jahrgang, S. 1110. Leipzig und Berlin, 1890. [The dwarf was A. Müller, aged 18, height 95 cm., well proportioned in all parts.]
257. COURTOIS-SUFFIT: Sur un cas d'arrêt de développement (Infantilisme). *Revue de Médecine*, 10^e Année, No. 7, pp. 588—599. Paris, 1890. [Pedigree No. 802.]
258. LE ROUX, HUGUES, ET GARNIER, J.: *Acrobats and Mountebanks*, translated from the French by A. P. Morton, pp. 60—70. London, 1890. [Gives short accounts of various dwarfs who have been exhibited.]
259. STANLEY, SIR H. M.: *The Great Forest of Central Africa, its Cannibals and its Pygmies*, pp. 20—26. London, 1890. [Gives an account of the pygmies he met with in Africa.]
260. STANLEY, SIR H. M.: *In Darkest Africa*, Vol. ii. Chap. 23, pp. 90—101. London, 1890. [Gives an account of the pygmies of Central Africa.]
261. BAGINSKY, ADOLF: Zur Kenntniss der congenitalen Makroglossie und der Beziehungen zwischen Makroglossie, Cretinismus, und congenitaler Rachitis. *Pædiatrische Arbeiten, Henoch's Festschrift*, S. 514—531. Berlin, 1890. [Pedigrees Nos. 791, 792 and 793.]

262. **PALTAUF, ARNOLD:** *Ueber den Zwergwuchs in anatomischer und gerichtsarztlicher Beziehung.* Wien, 1891. [A treatise on dwarf growth. Pedigree No. 727.]
263. **HUMPHRY, SIR GEORGE MURRAY:** Dwarfs, true dwarfs and dwarfs from rickets. *British Medical Journal*, 1891, Vol. II. pp. 1187—1188. London, 1891. [Gives measurements of the skeleton of a true dwarf which he bought in Paris and mentions another dwarf.]
264. **LANDAU, MAX:** *Ueber infantilen Habitus, infantile und Zwerg-Becken.* Inaug. Diss. Strassburg i. E. 1891. [He describes the characteristics of infantile and dwarf pelves and gives two cases of dwarfs bearing children. (1) See Pedigree No. 801. (2) A dwarf aged 25, height 33 cm. She said her parents and brothers and sisters were not very small. The labour was so long that clinical assistance was required and a small living child was extracted. A third case is given of a woman with a small pelvis, who had a small child, but apparently she was not a dwarf.]
265. **JACOBSEN, G. O.:** A family of dwarfs. *The Lancet*, 1891, Vol. I. p. 1040. London, 1891. [Pedigree No. 692.]
266. **VILLA, F.:** Un caso d' acondroplasia e del così detto rachitismo micromelico. *Annali di Ostetricia e Ginecologia*, Anno XIII. pp. 653—666. Milano, 1891. [Description of an achondroplastic foetus with some measurements and general remarks on achondroplasia.]
267. ***KUNDRAT, H.:** Ueber Wachstumsstörungen des menschlichen Organismus. II. Des Knochensystems. *Schriften des Vereines zur Verbreitung naturwissenschaftlicher Kenntniss in Wien*, Bd. XXXI. S. 327. Wien, 1891.
268. ***MORI, E.:** Contributo allo studio anatomo-patologico delle rachitide endo-uterina. *Rivista di Ostetricia e Ginecologia*, T. II. 2 Plates, pp. 513, 561. Torino, 1891.
269. ***SAGRETTI, C.:** Nuova patogenesi e cura della rachitide. *Giornale internazionale delle scienze mediche*, N. S., T. XXII. pp. 81—94. Napoli, 1891. And *Atti d. Cong. pediat. ital.* 1890, pp. 337—352. Napoli, 1891.
270. **SCHMIDT, ALEXANDER:** Zur Kenntniss des Zwergwuchses. *Archiv für Anthropologie*, Bd. XX. S. 43—81. Braunschweig, 1891—1892. [Pedigrees Nos. 683, 684, 786—790, 830, 831 and 834 (Jacob Hoepfner, Sophie Petersen, — Welsing, Therese Fend, Margaretha Reisberger, Wilhelm Willkowsky, Peter Rose, Heinrich Nisse and Jakob Muier).]
271. ***SCHANTAUER:** Ein Fall von foetaler Rachitis. *Pester medicinisch-chirurgische Presse. Wochenschrift für die gesammte Heilkunde*. Budapest, 1892.
272. **ORNSTEIN, BERNHARD:** Zwerg in Athen. Plate. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. *Zeitschrift für Ethnologie*, Bd. XXXIV. S. 541—543. Berlin, 1892. [Pedigree No. 816.]
273. **SCHOLZ, LUDWIG:** *Ueber fötale Rachitis.* Inaug. Diss. Gottingen, 1892. [A general discussion on the subject of foetal rachitis and its connection if any with myxoedema, cretinism, etc. Particulars of three cases are given without family history, all had short extremities. (1) p. 17, a female infant who died soon after birth, length 33 cm. (2) p. 28, a female infant, length 36 cm. (3) p. 51, a female foetus, length 28 cm.]
274. **SYMINGTON, JOHNSON, AND THOMSON, HENRY A.:** A Case of defective endochondral ossification in a Human Foetus (so-called cretinoid). Plate. *Reports from the Laboratory of the Royal College of Physicians, Edinburgh*, Vol. IV. pp. 237—254. Edinburgh, 1892. Also *Proc. R. Soc. Edinburgh*, Vol. XVIII. pp. 271—286. Edinburgh, 1890—1891. [Pedigree No. 821.]
275. **KAUFMANN, EDUARD:** *Untersuchungen über die sogenannte fötale Rachitis* (Chondrodystrophia foetalis). Berlin, 1892. [A general treatise on the subject. Bibliography. Pedigree No. 773.]
276. **LUGEOL, P.:** Achondroplasie. *Mémoires et Bulletins de la Société de Médecine et de Chirurgie de Bordeaux*, 1892, pp. 379—397. Bordeaux, 1893. And **Journal de Médecine de Bordeaux*, T. XXII. p. 461. Bordeaux, 1892. [Two observations: (1) Female infant, still-born at 6 months, the first-born illegitimate child of a well-formed girl aged 22. The father of the child was also well formed. The length of the child was 27 cm. She had a large head and short limbs. (2) A girl of 18, height 120 cm., with large head and short muscular limbs. Measurements and description are given. She was enceinte for the first time. Her parents were well formed and had had 9 children, of whom 7 were alive. The girl was the third child; all the others were well formed except the seventh who had malformation of the skull and only lived 48 hours. Premature confinement at 6 months was brought on, result a well-formed foetus, length 17 cm.]

277. SCHWARZWÄLLER, G.: Ueber sogenannte fötale Rachitis. *Zeitschrift für Geburtshülfe und Gynäkologie*, Bd. xxiv. S. 90—99. Stuttgart, 1892. [Describes a male child 42 cm. in length with short extremities. It was the second child of a normal mother and was either still-born or died. He also describes a still-born female child, 44 cm. in length, with short extremities and six fingers on each hand and six toes on each foot.]
- 277^b. VIRCHOW, R.: Vorstellung des Knaben Dobos Janos. *Berliner Klinische Wochenschrift*, 1892, Jahrgang 29, S. 517. Berlin, 1892. [Pedigree No. 734. Cf. Bibl. No. 401.]
278. VON FRANQUÉ, OTTO: Ueber sogenannte foetale Rachitis. *Sitzungsberichte der physikalisch-medizinischen Gesellschaft zu Würzburg*, Jahrgang 1893, S. 80—93. Würzburg, 1893. [Pedigree No. 630.]
279. KAUFMANN, EDUARD: Die Chondrodystrophia hyperplastica. Ein Beitrag zu den fötalen Skeleterkrankungen. *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Bd. xiii. S. 32—62. Jena, 1893. [General account.]
280. BOECKH, G.: Ueber Zwergbecken. *Archiv für Gynäkologie*, Bd. xliii. S. 347—372. Berlin, 1893. [Pedigree No. 620 (Kipke family).]
281. THOMSON, J.: Note on three living cases of achondroplasia. *Edinburgh Medical Journal*, Vol. xxxviii. Pt. ii. pp. 1109—1113. Edinburgh, 1893. [No history of heredity, the three cases were not related and their families were all well grown.]
282. MÜLLER, SIGFRID: Periostale Aplasie mit Osteopsathyrosis unter dem Bilde der sogenannten foetalen Rachitis. *Münchener med. Abhandlungen*, ii. Reihe, 7 Heft. München, 1893. [See Addenda to Bibliography for account of this paper.]
283. HUTCHINSON, SIR JONATHAN: A short limbed polydactylous dwarf. Plate. *Archives of Surgery*, Vol. iv. pp. 305—306. London, 1893. [The plate of the skeleton is copied from Theodore Kerckring's *Spicilegium Anatomicum*, published in Amsterdam, 1670. The limbs are short. Both hands have seven digits, the right foot has eight and the left nine digits.]
284. PARVIN, THEOPHILUS: The Influence of Maternal Impressions upon the Foetus. *International Medical Magazine*, Vol. i. pp. 487—493. Philadelphia, 1893. [p. 488 gives a picture of "The turtle man," evidently achondroplastic. Parvin says the deformity was produced by the mother being frightened by a turtle a few weeks after pregnancy began.]
285. HERMAN, GEORGE ERNEST: Cases of Caesarian Section. Remarks. *The Lancet*, 1893, Vol. ii. pp. 1508—1510 and 1565—1568. [p. 1566, Case 6, Pregnant woman aged 24. Height 3 ft. 6 in. Her stepmother said she was deformed from birth. Illustrations show characteristic achondroplastic type. Herman says deformity was partly due to rickets. Measurements are given. The mother recovered, the child was decomposing.]
286. PAAL, HERMANN: Ueber sogenannte foetale Rachitis. Inaug. Diss. Würzburg, 1893. [A general discussion of the views of various writers on the subject followed by a description of a case of his own. Pedigree No. 819.]
287. *CARTON: *Du rachitisme intra-utérin*. Thèse. Paris, 1893.
288. GUÉNIOT: Opération césarienne et rachitisme congénital. *Bulletin de l'Académie de Médecine*, T. xxix. pp. 99—100. Paris, 1893. [Pedigree No. 613.]
289. GUÉNIOT: Opérations césariennes multiples. *Bulletin de l'Académie de Médecine*, T. xxxii. pp. 16—18. Paris, 1894. [Pedigrees Nos. 613 and 824.]
290. KOLLMANN, J.: Pygmäen in Europa. *Verhandlungen der anatomischen Gesellschaft auf der achten Versammlung in Strassburg i. E. vom 13—16 Mai*, S. 206—215. Jena, 1894. *Anatomischer Anzeiger. Ergänzungsheft zum Band ix*. Jena, 1894. [On the pygmy races of Europe.]
291. *NEUMAIER, H.: *Zur Kenntniss des Zwergwuchs nebst Beschreibung eines neuen Falles von Zwergwuchs beim Menschen*. Erlangen, 1894.
292. MASON, R. OSGOOD: A Case of Congenital Rickets. Plate. *Archives of Pediatrics*, Vol. xi. pp. 670—672. New York, 1894. [Pedigree No. 811.]
293. TOWNSEND, CHAS. W.: A Case of Congenital Rachitis. Plate. *Archives of Pediatrics*, Vol. xi. pp. 761—763. New York, 1894. [Pedigree No. 764.]
294. TYSON, EDWARD: A Philological Essay concerning the Pygmies of the Ancients. *Bibliothèque de Carabas*, Vol. ix. London, 1894. [Reprint of No. 15.]

295. ROTH, JOSEPH HERMANN: *Ueber einen Fall von Chondrodystrophia fötalis (sog. fötale Rachitis)*. Inaug. Diss. Erlangen, 1894. [He discusses the views of various writers on the subject and gives a case of his own. The third child, a male, of a healthy father and a mother aged 28 whose mental faculties were sub-normal and who was said to be alcoholic. Measurements and a long description are given.]
296. HIRST, BARTON COOKE: Two recent additions to the teratologic Collection in the Wistar and Hornor Museum of the University of Pennsylvania. Specimens of Acephalus and Micromelus. 2 Plates. *The Medical News*, Vol. LXIV. pp. 184—185. Philadelphia, 1894. [Description of case of rachitis congenita micromelia.]
297. MAASS, KARL: Die sogenannte Puppenfee Helene Gabler. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. *Zeitschrift für Ethnologie*, Bd. xxvi. S. 364. Berlin, 1894. [Pedigree No. 731.]
298. SALVETTI, C.: Ueber die sogenannte foetale Rachitis. *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Bd. xvi. S. 29—41. Jena, 1894. [General discussion of the subject, with bibliography.]
299. *PORAK, C., ET DURANTE, G.: Sur un cas d'ostéogénèse anormale caractérisée par une résorption trop intense des travées osseuses tant d'origine cartilagineuse que périostéale. *Bulletins et Mémoires de la Société d'Obstétrique et de Gynécologie de Paris*, 1894, pp. 177—191. Paris, 1894.
300. GROTHOFF, FRANZ: *Ueber einen Fall von sogenannter fötaler Rachitis*. Inaug. Diss. Berlin, 1894. [The symptoms of rachitis are described at length, followed by description of four cases, three of which he states had been published before the fourth case came under his own observation. (1) In *J. B. der Charité*, pro 1885. The second child of a tall strong woman aged 24. Its length was 36 cm., weight 2110 grammes. The head was very large and the extremities, which were curved and shapeless with elephantiasis, were only small appendages to the large trunk. (2) In *J. B. der Charité*, 1888—9. Second child of a healthy mother aged 26, whose first child though healthy at birth had died, aged 8 weeks, of convulsions. The father was healthy. Length of child 43 cm., weight 2300 grammes. The bones of the skull were so soft that the shape was altered by pressure. The bones of the arms were straight, there was crepitation in the elbow joints, but it could not be decided whether these were fractures or not. The thighs were short, thick and curved. The child lived. (3) Male foetus, length 31·5 cm., with short thick extremities. (4) Male foetus, length 36 cm. and of normal weight, died shortly after birth with abnormally short crooked legs; a very full description is given. The author afterwards discusses the question of the heredity of the disease.]
- 300^b. RIEGER, K.: Demonstration des sogenannten "Vogelkopf-Knaben" Dobos Janos aus Battonga in Ungarn. *Sitzungsberichte der Würzburger Physikalisch-medicinische Gesellschaft*, Jahrg. 1895, S. 113—128. Würzburg, 1896. [Says Dobos Janos was not rachitic or cretinous, and compares him with a true dwarf Charlotte Uehlein. His height was 107 cm., weight 13·2 kilogs. Cf. Bibl. Nos. 277^b and 400^b.]
301. APERT, E.: Achondroplasia. *Bulletins de la Société Anatomique de Paris*, T. LXX. pp. 772—775. Paris, 1895. [Account of a female achondroplastic child, who died at birth. Length 31 cm. A first-born child but no family history.]
302. MANOUVRIER, L.: Observations d'un microcéphale vivant et la cause probable de sa monstruosité. *Bulletins de la Société d'Anthropologie de Paris*, 4^e Série, T. vi. pp. 227—230. Paris, 1895. [Pedigree No. 785. See Bibl. No. 441^b.]
303. LAMPE, RICHARD: *Ueber zwei Fälle von sogenannter fötaler Rachitis*. Inaug. Diss. Marburg, 1895. [Very full descriptions of two cases are given. (1) Infant unsexed, born in 35th week of pregnancy, died soon after birth, with short extremities, length 46 cm. (2) A male infant, length 45 cm., with extraordinarily short extremities. It either died or was still-born. The mother was an idiot with scoliosis, genu valgum and pes equinus, and had apparently been rendered pregnant by her own father.]
304. HERTOGHE, E.: De l'influence des produits thyroïdiens sur la croissance. *Bulletins de l'Académie Royale de Médecine de Belgique*, iv^e Série, T. ix. pp. 897—935. Bruxelles, 1895. [Pedigree No. 810.]
305. BUDAY, K.: Beiträge zur Lehre von der Osteogenesis Imperfecta. *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften. Mathematisch-naturwissenschaftliche Classe*, Bd. civ. Abth. 3, S. 61—101. Wien, 1895. [pp. 88—89 describe foetal rickets.]
306. MEIGE, HENRY: L'infantilisme, le féminisme et les hermaphrodites antiques. *L'Anthropologie*, T. vi. pp. 257—275, 414—432, 529—548. Paris, 1895. [Some cases of dwarfed growth.]

307. MARGARUCCI: Du rachitisme foetal. *La Semaine Médicale*, 15^e année, 1895, pp. 486—487. Paris, 1895. [Merely a notice of a communication on foetal rickets made the 10th meeting of the Italian Chirurgical Society at Rome, Nov. 1895. No particular case mentioned.]
308. HALIBURTON, R. G.: Survivals of Dwarf Races in the New World. *Reprint from the Proceedings of the American Association for the Advancement of Science*, 1894, Vol. XLIII. pp. 337—344. Salem, 1895. [Short paper on the Dwarf Races of both Old and New Worlds.]
309. HALIBURTON, R. G.: Dwarf Survivals, and Traditions as to Pygmy Races. *Proceedings of the American Association for the Advancement of Science*, 1895, Vol. XLIV. pp. 285—286. Salem, 1896. [Title explains contents.]
310. ZIEGLER, E.: Durch Entwicklungs- und Wachstumsstörungen bedingte Knochenveränderungen. *Ziegler's Lehrbuch der speciellen pathologischen Anatomie*, Bd. II. pp. 163—165. Jena, 1895. [On dwarf growth, micromelia or nanosomia, with plates of two dwarf female skeletons. (1) A woman aged 31 and 118 cm. in height. (2) A woman aged 58 and 117 cm. in height.]
311. HUTCHINSON, SIR JONATHAN: Two cases of dwarfdom with arrested development of skin and appendages. *Archives of Surgery*, Vol. VI. pp. 140—142. London, 1895. [This gives further particulars of case previously published. See Bibl. No. 230. A boy aged 14 in 1894, height 43 inches. He had no hair or eyelashes. His mother was bald from girlhood. The second case is a similar case of Hastings Gilford.]
312. HALIBURTON, R. G.: Zwergstämme in Sud und Nord Amerika. *Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. Zeitschrift für Ethnologie*, Bd. XXVIII. S. 470—472. Berlin, 1896. [Letters from Haliburton to Virchow about pygmies in Guiana and pygmy graves in Tennessee.]
313. VERNEAU, B.: Nains et Géants. *L'Anthropologie*, T. VII. p. 118. Paris, 1896. [Merely a short note on Auguste Tuillon and two giants: see Bibl. No. 324.]
314. FELDMAN, GUSTAV: Ueber Wachstumsanomalien der Knochen. *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Bd. XIX. S. 565—646. Jena, 1896. [pp. 594 et seq. discuss various kinds of dwarf growth. There is a long bibliography and tables of measurements.]
315. HUTCHINSON, SIR JONATHAN: A short-limbed dwarf, multiple exostoses. *The Clinical Journal*, Vol. VIII. p. 333. London, 1896. [The subject was a man of deficient intellect, aged 38. Height 4½ feet.]
316. HERTOEGHE, E.: Diagnostic de la possibilité d'une reprise de croissance dans les arrêts ou retards notables dûs au myxoedème, à l'hyperazoturie et au rachitisme. *Bulletins de l'Académie Royale de Médecine de Belgique*, IV^e Série, T. X. pp. 564—569. Bruxelles, 1896. [Paper showing the possibility of deciding, by a radiographic examination, whether or not any treatment would increase growth.]
317. MEIGE, HENRY: Les Nains et les Bossus dans l'Art. 3 Plates. *Nouvelle Iconographie de la Salpêtrière*, T. IX. pp. 161—168. Paris, 1896. [Descriptions of pictures of various dwarfs.]
318. KOLLMANN, J.: Der Mensch. Nuesch's *Schweizerbild. Neue Denkschriften der allgemeinen schweizerischen Gesellschaft für die gesammten Naturwissenschaften*, Bd. XXXV. S. 134—152. Zürich, 1896. [On the bones of an ancient pygmy race found in Switzerland.]
319. MAKINS, G. H.: A Case of Intra-uterine rickets. *St Thomas's Hospital Reports*, N. S., Vol. XXIII. pp. 121—124. London, 1896. [Description of a child aged 14 days, very small and weighing only 5½ pounds in its clothes and with every deformity common to ordinary rickets. There are no measurements and no statement is made with regard to the length of the limbs, but the bones were curved and thickened. The mother was healthy and had an elder child who had also developed rickets.]
320. CHAMBRELENT: Sur un cas d'achondroplasie, cause de dystocie foetale. **Gazette hebdomadaire des sciences médicales de Bordeaux*, T. XVII. p. 271, Bordeaux, 1896, and **Journal de Médecine de Bordeaux*, T. XXVI. p. 204, Bordeaux, 1896.
321. TISSIÉ: Un cas de double nanisme fraternel. Présentation de malades. *Mémoires et Bulletins de la Société de Médecine et de Chirurgie de Bordeaux*, 1896, pp. 408—415. Bordeaux, 1897. [Podigree No. 706.]
322. NAGEL, J. DARWIN: Princess Paulina. *Pediatrics*, Vol. II. No. 8, pp. 369—373. New York and London, 1896. [Podigree No. 728: see Bibl. Nos. 129, 196, 214, 215.]

323. MAASS, KARL : Birmesischen Zwerge mit einem Salzburger Riesen. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. *Zeitschrift für Ethnologie*, Bd. xxviii. S. 524—526. Berlin, 1896. Also Bd. xxx. S. 344, Berlin, 1898, and Bd. xxxi. S. 455, Berlin, 1899. [Pedigree No. 709.]
324. MANOUVRIER, L. : Sur le nain Auguste Tuillon, et sur le nanisme simple avec ou sans microcéphalie. *Bulletins de la Société d'Anthropologie de Paris*, 4^e Série, T. vii. pp. 265—289. Paris, 1896. [Pedigree No. 736. In the discussion on the paper Pedigrees Nos. 738, 739 and 775 are given, also a reference to family in Pedigree No. 744 : see Bibl. No. 313.]
325. NEHRING, A. : Ueber das Vorkommen von Zwergen neben grossen Leuten in demselben Volke. Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. *Zeitschrift für Ethnologie*, Bd. xxix. S. 91—94. Berlin, 1897. [A notice of Herberstein's *Rerum Muscoviticarum Commentario*, published 1557, about a people who lived between Prussia and Livonia, in the families of which were both very tall children and dwarfs.]
326. *VON GELDEM-EGMOND, FRAU GRAFIN : *Beitrag zur Casuistik der sogenannten foetalen Rachitis*. Inaug. Diss. Zurich, 1897.
327. *MANOUVRIER, L. : Le période de croissance d'un nain. *Journal de clinique et de thérapeutique infantiles*, T. v. pp. 1009—1012. Paris, 1897.
328. HALIBURTON, R. G. : *How a pygmy race was found in North Africa and Spain, and papers on other subjects*, pp. 1—96. Toronto, 1897. [This contains the following papers on dwarfs. (1) Notes on Mt. Atlas and its Traditions. (2) Dwarf Races and Dwarf Worship. (3) The Dwarfs of Mt. Atlas. (4) Some further notes on the existence of Dwarf Tribes south of Mt. Atlas. (5) Racial Dwarfs in the Atlas and Pyrenees, Pts I, II. and III. (6) Survivals of Dwarf Races in the New World. (7) Dwarf Survivals and Traditions as to Pygmy Races. (8) The Tiki-Tiki. (9) The dwarf domestic animals of Pygmies.]
329. KLINGER, P. : *Ueber einen Fall von Chondrodystrophia hyperplastica und seine Beziehung zur sogenannten foetalen Rachitis*. Inaug. Diss. Freiburg i. B. 1897. [An account of the views of various authors on the subject of rachitis, with particular reference to Kirchberg, Marchand and Kaufmann. A new case is described which was preserved in the Pathological Institute. Length of foetus 27.5 cm.]
- 329^b. HERTOEGHE, E. : Nouvelles Recherches sur les arrêts de croissance et d'infantilisme. *Bulletin de l'Académie de Médecine de Belgique*, 4^e Série, T. xi. pp. 750—760. Bruxelles, 1897. [Chiefly an article on the effect of the thyroid treatment on growth, with examples.]
330. MANOUVRIER, L. : Observations sur quelques nains. *Bulletins de la Société d'Anthropologie de Paris*, 4^e Série, T. viii. pp. 654—664. Paris, 1897. [Remarks on some dwarfs, including "Princesse Blanche." Pedigree No. 737. See also Bibl. Nos. 341 and 345.]
331. OSLER, WM. : Sporadic Cretinism in America. *Transactions of the Congress of American Physicians and Surgeons*, 1897, Vol. iv. pp. 169—206. New Haven, Conn. 1897. [Pedigree No. 639.]
332. GOULD, GEORGE M., AND PYLE, WALTER L. : *Anomalies and Curiosities of Medicine*, pp. 333—343. Philadelphia, 1897. [Gives accounts, not always trustworthy, of most of the well-known dwarfs. Pedigree No. 697 (Rusow Brothers).]
333. HUTCHINSON, SIR JONATHAN : A case of hypertrophy of the gums with general dwarfism. *Edinburgh Medical Journal*, N. S., Vol. i. Pt II. pp. 117—118. Edinburgh, 1897. [Gives account of a youth who was a dwarf in stature, age 25. No measurements and no family history. Mentions two other cases of dwarfism.]
334. BRISSAUD, E. : De l'infantilisme myxoedémateux. Plates. *Nouvelle Iconographie de la Salpêtrière*, T. x. pp. 240—282. Paris, 1897. [Some of the cases appear to be of dwarfed stature. No family history.]
335. UHTHOFF, W. : Ein Beitrag zu den Störungen bei Zwergwuchs und Riesenwuchs resp. Akromegalie. *Berliner klinische Wochenschrift*, xxxiv. Jahrgang, S. 461—464, 501—504, 537—540. Berlin, 1897. [pp. 461—464 are on dwarf growth. Account of a girl aged 14, height 131 cm. Her growth had stopped at age of 9 and eyes became affected. Pedigree No. 808.]
336. TSCHISTOWITSCH, TH. : Zur Frage von der angeborenen Rachitis. *Virchow's Archiv*, Bd. cxlviii. S. 140—177, 209—233. Berlin, 1897. [A general discussion on rachitis.]
337. REGNAULT, FELIX : Le Dieu Egyptien Bès était myxoedémateux. *Bulletins de la Société d'Anthropologie de Paris*, 4^e Série, T. viii. pp. 434—439. Paris, 1897. [This is a paper to prove that Bès was in type myxoedematous and a cretin.]

338. JACQUES, V.: Les nains. *Bulletin de la Société d'Anthropologie de Bruxelles*, T. xvi. pp. 282—302. Bruxelles, 1897. [A paper giving an account of the pygmies in ancient literature and of the pygmy races in Africa.]
339. MEIGE, HENRY, ET ALLARD, FELIX: Deux Infantiles. Infantile myxoedémateux et infantile de Lorain. *Nouvelle Iconographie de la Salpêtrière*, T. xi. pp. 105—113. Paris, 1898. [First Case, Pedigree No. 800. Second Case, no family history.]
340. HITSCHMANN, RICHARD: Augenuntersuchungen bei Cretinismus, Zwergwuchs und verwandten Zuständen. *Wiener klinische Wochenschrift*, xi. Jahrgang, S. 655—666. Wien, 1898. [He discusses the condition of eyes in cases of dwarf growth. Pedigree No. 732.]
341. CAPITAN: Photographies anthropologiques. Données physiologiques. *Revue Mensuelle de l'Ecole d'Anthropologie de Paris*, T. viii. pp. 112—113. Paris, 1898. [Account of Blanche B., known as "La Princesse Blanche" or "La Naine de Bazas"—written in conjunction with Manouvrier's paper on same subject. See Bibl. No. 345 and Pedigree No. 737.]
342. LAFFARGUE, EVARISTE: Sur un cas d'achondroplasie. *La Médecine Moderne*, 8^e Année, pp. 364—366. Paris, 1898. [This is the case of a man aged 50, height 98 cm., of Berber-negro race. Full measurements are given but no family history.]
343. LAFFARGUE, EVARISTE: Quatre nouveaux cas d'achondroplasie. *La Médecine Moderne*, 8^e Année, pp. 515—516. Paris, 1898. [Case (1), a man aged about 40, height 121 cm., of Berber-negro race. Case (4), a man aged about 50, height 111 cm., pure negro. Cases (2) and (3) are brothers. Pedigree No. 673.]
344. *MANOUVRIER, L.: Le nain Boffy. [Abst.] *Journal des connaissances médicales pratiques et de pharmacologie*, 1898, p. 19. Paris, 1898.
345. MANOUVRIER, L.: Photographies anthropologiques, Mensurations. Naine de Bazas. 5 Plates. *Revue Mensuelle de l'Ecole d'Anthropologie de Paris*, T. viii. p. 111. Paris, 1898. [Measurements of Blanche B., la naine de Bazas or la Princesse Blanche, with three pictures of Blanche and two of her mother. Pedigree No. 737. See also Bibl. Nos. 330 and 341.]
346. MAYGRIER, CHAS.: Présentation d'un foetus achondroplasique. Présentation de photographies, du moulage, d'une radiographie et du squelette. *Bulletin de la Société d'Obstétrique de Paris*, T. i. pp. 248—255. Paris, 1898. [Pedigree No. 761.]
347. BOISSARD: Opération césarienne faite à la Maternité; mère et enfant vivants. *Bulletin de la Société d'Obstétrique de Paris*, T. i. pp. 33—36. Paris, 1898. [Pedigree No. 762.]
348. JOHN, RUDOLF: Ueber die sogenannte foetale Rachitis. Inaug. Diss. Berlin, 1898. [He divides rachitic affections into three groups, (1) true post-uterine rachitis, (2) congenital rachitis, (3) so-called foetal rachitis, gives the characteristic symptoms of each group and describes fully a case which appeared on S. 15 *Polikl. Journal*, No. 766, 1897—8. A woman aged 38, who had had seven living children and two miscarriages, came to hospital for her confinement. She stated that she and her husband were healthy and their families were healthy. The skull of the child, a male, was fractured in the endeavour to extract it. The length was about 42 cm. The extremities were short and there was no external division between the upper- and forearm or between the thigh and leg.]
349. *REGNAULT, FELIX: Des altérations crâniennes dans le rachitisme. Thèse. Paris, 1898.
350. WEISS, SIEGFRIED: Demonstration eines Falles von echten proportionirten Zwergwuchs in Kindesalter. *Wiener klinische Wochenschrift*, xi. Jahrgang, S. 1212. Wien, 1898. [Description of a dwarf boy, 7 years old, 76 cm. in height. No family history.]
351. JOHANNESSEN, AXEL: Chondrodystrophia foetalis hyperplastica. *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Bd. xxiii. S. 351—374. Jena, 1898. [Pedigree No. 759.]
352. GARROD, ARCHIBALD: A Case of Achondroplasia. Plate. *Transactions of the Clinical Society*, Vol. xxxi. pp. 294—295. London, 1898. [Description of an achondroplastic girl, aged 6, height 37½ inches. No family history.]
353. JOACHIMSTHAL: Fall von sogenannter fötaler Rachitis. *Berliner klinische Wochenschrift*, 1899, Jahrgang 36, S. 245—246. Berlin, 1899. [A girl aged 11, with abnormally short extremities. Her growth had stopped at the age of 3. Height when seen in 1898, 83 cm. The tips of her fingers with arms hanging barely reached the trochanters. She was intelligent. A description is given but no measurements or family history.]

354. TURNER, WM.: On Achondroplasia. *The Practitioner*, Vol. LXIII. pp. 263—277. London and New York, 1899. Also: A case of achondroplasia or chondrodystrophia hyperplastica, aet. 10½ years. *Transactions of the Clinical Society*, Vol. xxxii. pp. 269—271. London, 1899. [Pedigree No. 636.]
355. FLEMMING, CHAS. E. S.: Achondroplasia. *The Bristol Medico-Chirurgical Journal*, Vol. xvii. No. 63, pp. 21—27. Bristol, 1899. [Pedigree No. 832.]
356. EDGEWORTH, F. H.: Case of Achondroplasia. Plate. *Bristol Medico-Chirurgical Journal*, Vol. xvii. pp. 27—29. Bristol, 1899. [Description of an achondroplastic man aged 59, height 4 ft. 8 inches, one of a numerous family the other members of which were of normal stature. He had no children. Edgeworth states he knew four other cases in Bristol by sight.]
357. SCHWENDERER, BURKHARD: *Untersuchungen über Chondrodystrophia foetalis*. Inaug. Diss. Basel 1899. [Schwenderer adopts Kaufmann's classification. pp. 7—21 describe four cases: (1) length 40 cm., no family history; (2) length 37 cm., offspring of normal parents whose other children were normal; (3) length 36 cm., no family history; (4) Pedigree No. 777. pp. 48—49 describe two more cases: (1) length 28.5 cm., with normal parents, brothers and sisters; (2) a male foetus 21 cm. in length, eleventh child of the mother. These two cases are, he says, types of micromelia, but are free from chondrodystrophia foetalis.]
358. STOELTZNER, WILHELM: Fötale Myxodem und Chondrodystrophia foetalis hyperplastica. *Jahrbuch für Kinderheilkunde*, Bd. L. S. 106—123. Leipzig, 1899. [A description of the autopsies of two foetuses is given and the author points out that all cases described as foetal rachitis do not belong to the same type of disease.]
359. SCHMIDT, M. B.: Allgemeine Pathologie und pathologische Anatomie der Knochen. *Leubarsch und Ostertag's Ergebnisse der allgemeinen Pathologie und pathologischen Anatomie des Menschen und der Tiere*, iv. Jahrgang, S. 531—650. Wiesbaden, 1899. [S. 599—612, Chondrodystrophia foetalis. S. 612—617, Osteogenesis Imperfecta. S. 617—626, Kretinismus. S. 626—632, Wahrer Zwergwuchs (Nanosomie). S. 632—650, Die Rachitis. There is a bibliography, but no pedigrees or special cases.]
360. *SPILLMANN, L.: *Rachitisme*. Thèse. Nancy, 1899-1900.
- 360^b. BERNHARD, L.: Fall von fötaler Rachitis. *Berliner klinische Wochenschrift*, 1899, Jahrgang 36, S. 245. Berlin, 1899. [Child aged 9. Parents and sisters healthy. It had very short curved extremities. Description given but no measurements. Said to be a case of what Marchand calls "Mikromelia chondromalacia."]
361. *BAGINSKY, A.: Rachitis foetalis. *Berliner medicinische Gesellschaft*, 15 Feb. 1899. [Not found.]
362. HENoch, EDUARD: Die Rachitis. *Vorlesungen über Kinderkrankheiten*, 10th Edition, S. 865—886. Berlin, 1899. [pp. 878—880 on foetal rachitis.]
363. JOACHIMSTHAL: Ueber Zwergwuchs und verwandte Wachstumsstörungen. *Deutsche medicinische Wochenschrift*, xxv. Jahrgang, No. 17, S. 269—271. No. 18, S. 288—290. Berlin, 1899. [In No. 17 some true dwarfs are described. One of them from Königsberg was well built and mentally well developed. At age of 36 his height was 128 cm. He said he had a sister backward in growth. In No. 18 radiographs and descriptions of achondroplastic dwarfs are given. No family history.]
364. STERNBERG, MAXIMILIAN: Vegetationsstörungen und Systemerkrankungen der Knochen. 1899. *Nothnagel's specielle Pathologie und Therapie*, Bd. vii. 2^{te} Hälfte. Wien, 1903. [104 pages on dwarf growth in general with long bibliography. This work is largely used pp. 363—370 above.]
365. HILDEBRANDT, H.: Ueber Osteogenesis Imperfecta. *Virchow's Archiv*, Bd. CLVIII. S. 426—444. Berlin, 1899. Also *Münchener medicinische Wochenschrift*, 1899, S. 30. München, 1899. [Description of an infant which died nine hours after birth, with very short limbs. Mother healthy. No family history. And a general discussion on Osteogenesis Imperfecta, Chondrodystrophia foetalis, etc.]
366. SCHUCHARDT, KARL: Intrauterin-erworbene Skeletatrophie (Früher sogenannte fötale Rachitis). Die Krankheiten der Knochen und Gelenke. *von Bruns' Deutsche Chirurgie*, Bd. 28, Kapitel viii. S. 58—64. Stuttgart, 1899. [The contents of the chapter are the following: Fötaler Kretinismus mit Hemmung des Längenwachstums (chondralen Dysplasie). Fötaler Kretinismus, Victor Horsley. Pseudo-rachitismus, Eberth. Kretinoid oder Kretinoide Dysplasie, Klebs. Chondrodystrophia foetalis, Kaufmann. Micromelia Chondromalacia, Marchand. Achondroplasia, Porak. One description is given of them all.]

367. THOMSON, JOHN: Case of a peculiar form of dwarfed growth with notes of the post mortem by Jessie Macgregor. *The Scottish Medical and Surgical Journal*, Vol. vi. No. 3, pp. 209—214. Edinburgh, 1900. [Pedigree No. 779.]
- 367^b. SCHIEB: Ueber Osteogenesis Imperfecta. *von Bruns' Beiträge zur klinischen Chirurgie*, Bd. xxvi. Supplement, S. 93—119. Tübingen, 1900. [Pedigree No. 767.]
368. Article: Les Bouts d'Homme. *Almanach Hachette*, 1900, pp. 356—357. Paris, 1900. [Pictures of the following dwarfs are given: Doubrof, aged 31, height 107 cm. Hop o' my Thumb, aged 12, height 67 cm. Ida Blumenthal, aged 22, height 80 cm. Hippolyte Bureau, an achondroplastic dwarf, died aged 29, height 80 cm. Adrien Esmlaire, aged 16, height 69 cm. Victor Still, died aged 47, an achondroplastic dwarf, height 80 cm. Paul Naf, age not given, height 84 cm. La petite reine Mah, aged 19, height 70 cm.]
- 368^b. SPILLMANN, LOUIS: Maladie de Barlow. Rachitisme intrautérin. *Le Rachitisme*, Chap. III. pp. 116—127. Paris, 1900. [A book with an atlas dealing very fully with the subject of rachitis, giving various observations and also experiments on animals. Chap. III. treats of achondroplasia.]
369. GILBERT, A., ET RATHERY, F.: Le Nanisme Mitral. *La Presse médicale*, 1900, No. 37, pp. 225—227, No. 38, pp. 231—233. Paris, 1900. [Three cases are given, but from modern standpoint they are not true dwarfs. They are termed cases of "Infantilisme du type Lorain et Faneau de la Cœur." They are (1) a male aged 54, height 142 cm.; (2) a female aged 39, height 150 cm.; (3) a female aged 52, height 140 cm. There is some family history for each case.]
370. LEGRY, T.: Trois Cas d'Achondroplasie. *La Presse médicale*, 1900, p. 105. [Merely a note about a Séance of the Société Anatomique de Paris stating that Legry had studied two achondroplastic skeletons and one achondroplastic body. The *Bulletin de la Société Anatomique* for 1900 does not contain a description of them.]
371. MARIE, P.: L'achondroplasie dans l'adolescence et dans l'âge adulte. *La Presse médicale*, 1900. Deuxième Séan., No. 56, pp. 17—23. Paris, 1900. Also: *La Revue médicale*, 1900, p. 21. [Pedigree No. 674.]
372. DURANTE, G.: Deux cas d'achondroplasie avec examen histologique des os et du système nerveux. *Bulletins de la Société Anatomique de Paris*, 6^e Série, T. II. pp. 785—786. Paris, 1900. [A short description of the cases without family history or measurements. One mother was syphilitic, the other had a renal affection.]
373. PORAK, C., ET DURANTE, G.: Deux cas d'Achondroplasie avec examen histologique. *Annales de Gynécologie et d'Obstétrique*, July—August. Paris, 1900. [Seen in offprint.]
374. COLLEVILLE: Sur un cas d'achondroplasie chez l'adulte. *Union médicale du Nord-Est*, T. XXIV. pp. 205—210. Reims, 1900. [Account with photographs and radiograph of an achondroplastic dwarf aged 46, named Alexandre D..., normal sister and no family history.]
375. PORAK, C., ET DURANTE, G.: Deux cas d'Achondroplasie avec autopsie. *Congrès international des sciences médicales*. Paris, août, 1900. [The same as Bibl. No. 373.]
376. *PAULY ET DE TEYSSIER, B.: Un cas d'achondroplasie. *La Province médicale*, 1900, T. XIV. p. 409. Lyon, 1900.
377. BOQUEL, A.: Bassin rachitique; opération césarienne à terme; mère et enfant vivants. *Bulletin de la Société d'Obstétrique de Paris*, T. III. pp. 416—418. Paris, 1900. [Pedigree No. 813.]
378. HERGOTT, ALPHONSE: Un cas d'achondroplasie. *Comptes Rendus de la Société d'Obstétrique de Gynécologie et de Paediatric de Paris*, T. II. pp. 38—57. Plate. Paris, 1900. [Female infant, second child of a tuberculous mother aged about 24, who had lost 12 brothers and sisters, most of them of tuberculosis. She herself had been obliged to remain three years in bed, on account of some illness which would have deformed her legs if they had not been kept straight by boards. She had also been operated on for simple unilateral hare-lip. The child, whose weight was 2200 grammes, died after taking a few breaths. She had a very large head and the limbs, especially the thighs, were very short. There is a short discussion of the various theories on the subject of rachitis.]
379. *FEDE E CARACE: *La Pediatria*, 1900, No. 2. Napoli, 1900.
380. *DE BUCK: L'Achondroplasie: *La Belgique Médicale*, 1900, No. 50, p. 737.
381. KIRK, ROBT.: Case of Modified Cretinism. *Transactions of the Medico-Chirurgical Society of Glasgow*, Vol. II. pp. 319—320. Glasgow, 1900. [Description of a boy aged 20½, height 4 ft. and ½ inch. No family history. The boy was bright and intelligent although below average capacity. See also Bibl. No. 390.]

382. LEGRY, T.: Achondroplasia. *V. Cornil et L. Ranvier's Manuel d'histologie pathologique*, T. 1. pp. 799—800. Paris, 1901. [A very short article on the chief characteristics of achondroplasia.]
383. NOBLE, WILSON: Achondroplasia. *Archives of the Röntgen Ray*, Vol. v. No. 2, pp. 55—56 and Plate CIII. London, 1901. [Radiograph of the arm and ribs of a boy aged 8, with a short note by Mr Holderness for whom the radiograph was taken.]
384. ZIMMERN, A.: Sur un cas de rachitisme familiale. Plate. *Nouvelle Iconographie de la Salpêtrière*, T. xiv. pp. 299—304. Paris, 1901. [This gives a family history and pedigree of true rachitis: the plate is reproduced in present paper; see Plate Y (33—35).]
385. CESTAN, R.: À propos d'un cas d'achondroplasia. *Nouvelle Iconographie de la Salpêtrière*, T. xiv. pp. 277—289. Paris, 1901. [Pedigree No. 652.]
386. APERT, E.: Quelques remarques sur l'achondroplasia. Deux observations nouvelles de l'achondroplasia adulte. *Nouvelle Iconographie de la Salpêtrière*, T. xiv. pp. 288—298. Paris, 1901. [No family history of these cases given, but one of them was found later to be father of the girl described by Sevestre, Bibl. No. 492, Pedigree No. 612.]
387. MOLIN, HENRI: *Étude Radiographique et Clinique sur la Dyschondroplasia*, 21 Figs., pp. 60—66. Paris, 1901. [A memoir of 122 pages on Dyschondroplasia. pp. 60—66 are on Achondroplasia. There are sections on Osteogenesis Imperfecta, Osteomalacia, Rachitis and Osteogenic Exostoses.]
- 387^b. RICHER, PAUL: Les Nains, les Bouffons, les Idiots. *L'Art et la Médecine*. Paris, 1901. [Gives account and reproductions of various pictures of dwarfs.]
388. CESTAN, R., ET INFROIT, L.: Étude radiographique d'un cas d'achondroplasia. *Revue neurologique*, T. ix. pp. 437—438. Paris, 1901. [Merely a radiographic examination of the case, without measurements or family history.]
389. REGNAULT, FELIX: *Bulletin de la Société Anatomique de Paris*, 6^e Série, T. iii. Paris, 1901. [pp. 178—179, Diagnostic de l'achondroplasia par l'examen macroscopique des os foetaux; pp. 179—181, Achondroplasia des os et du tronc; pp. 181—182, Achondroplasia partielle; pp. 182—185, Os d'adulte achondroplasiaque; pp. 185—187, Squelette d'achondroplasia adulte (forme classique); pp. 187—189, Sur un squelette d'achondroplasia adulte (type non-classique); pp. 189—192, Sur un squelette d'achondroplasia adulte n'offrant pas tous les signes classiques de ce maladie; pp. 386—389, L'achondroplasia chez le chien; pp. 419—421, Des variétés d'achondroplasias foetales; pp. 424—426, Du crâne de l'achondroplasia chez le fœtus et chez l'adulte; pp. 507—509, Quelques nouveaux cas d'achondroplasia; p. 509, Nanisme vrai chez les adultes; pp. 559—560, Sur un squelette de fœtus atteint d'achondroplasia hyperplasique et généralisée.]
- 389^b. APERT, E. (1) Sur le traitement thyroïdien dans l'infantilisme. (2) Examen histologique du corps thyroïde et d'autres organes d'un sujet atteint d'infantilisme. *Bulletins de la Société de Pédiatrie de Paris*, mai et juin, 1901, pp. 1—8. Paris, 1901. [Two observations are given, one in which thyroid treatment appeared to improve the child, the other in which the patient, a youth aged 19, height 126 cm., died and the autopsy showed the thyroid body larger than normal. Apert suggests thyroid treatment would have also succeeded in this case.]
- 389^c. APERT, E. Traitement de l'Infantilisme et de la cryptorchide par les préparations thyroïdiennes. *Le Bulletin Médical*, 20 avril, 1901, pp. 1—35. Paris, 1901. [Three observations are given; the first two are stated to have been cured by thyroid treatment; the third, a youth aged 21, height 115 cm., died of tuberculosis shortly after his entrance to hospital. The father said he had ceased to grow at age of 9. He was the second of seven children, all of whom had died young. The autopsy showed the thyroid body was well developed and healthy, but in an infantile condition.]
390. KIRK, ROBERT: On serous vaccinia in connexion with cretinism and rickets. *The Lancet*, 1901, Vol. 1. pp. 1266—1268. London, 1901. [One of the cases given in the paper appeared to members of the Med. Chir. Soc., Glasgow, not to be cretinism. See Bibl. No. 381.]
391. PATEL: Nanisme isolite. *Gazette hebdomadaire de Médecine et de Chirurgie*, 1901, Année XLVIII. No. 26, pp. 301—306. Paris, 1901. [Pedigree No. 812.]
392. MEIGE, HENRY: Remarques complémentaires sur les nains dans l'art. Plate. *Nouvelle Iconographie de la Salpêtrière*, T. xiv. pp. 371—372. Paris, 1901. [Gives a list of statues and pictures of dwarfs, stating where they are to be found.]
393. HARBITZ, FRANCIS: Ueber Osteogenesis Imperfecta. *Ziegler's Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*, Bd. xxx. S. 605—638. Plates. Jena, 1901. [Gives some account of the literature on the subject and an additional case of his own, an achondroplastic (?) illegitimate child of healthy parents, who died soon after birth. Length 37·5 cm.]

394. COLLMANN, BENNO: Beitrag zur Kenntniss der Chondrodystrophia foetalis. *Virchow's Archiv*, Bd. CLXVI. S. 1—12. Berlin, 1901. [A long description of a female foetus, length 33 cm., with very short limbs. No family history.]
395. VIRCHOW, RUDOLF: Rachitis foetalis, Phocomelie und Chondrodystrophia. *Virchow's Archiv*, Bd. CLXVI. S. 192—194. Berlin, 1901. [A criticism of Collmann's paper. Bibl. No. 391.]
396. NIJHOFF, G. C.: Baring bij Bekkenvernaauwing. *Overdruk uit het Nederlandsch Tijdschrift voor Verloskunde en Gynaecologie*, 1901, Deel xi. pp. 1—64. 1901. [Pedigree Nos. 664 and 817. Two other cases, dwarfs having children, are given.]
397. KLEIN, ALBERT: Neuere Arbeiten uber "die sogenannte fötale Rachitis." *Centralblatt für allgemeine Pathologie und pathologische Anatomie*, Bd. xii. S. 839—849. Jena, 1901. [A general discussion on foetal rachitis.]
- 397^b. *ESERICH: Demonstration eines Falles von Chondrodystrophia foetalis. *Sitzungsbericht des Vereins der Aertze in Steiermark*, 1901.
398. *BOSSI: Sopra un caso di acondroplasia vivante. *Archivio Italiano de ortopedia*, No. 3, p. 141, 1901. Also *Bollettino dell' Associaz. sanitaria Milanese*, Jan. 1901.
399. *FOCHIER: Squelette d'achondroplase. *Société de Chirurgie de Lyon*, Dec. 26, 1901.
400. *SIMMONDS: Untersuchungen von Missbildungen mit Hülfe des Röntgenstrahlen. *Fortschritte auf dem Gebiete der Röntgenstrahlen*, Bd. iv. Heft 4, 1901.
- 400^b. SIMMONDS: Ueber die sogenannte foetale Rachitis. *Munchener Medizinische Wochenschrift*, 1901, Jahrgang 48, S. 1263—1264. München, 1901. [Some remarks on chondrodystrophia hypoplastica and chondrodystrophia hypertrophica. He showed pictures taken by the Rontgen rays and microphotographs. The two cases were published in *Fortschritte auf d. Gebiete d. Röntgenstrahlen*, Bibl. No. 400.]
401. VON HANSEMANN: Echte Nasonomie, mit Demonstration eines Falles. *Berliner klinische Wochenschrift*, 1902, xxxix. Jahrgang, No. 52, S. 1209—1212. Berlin, 1902. [See Bibl. Nos. 277^b, 454 (Dobos Janos). Pedigree No. 734.]
402. HEATLEY, H. R.: *Life and love-letters of a dwarf, Joseph Boruwlaski*. London, 1902. [This work is apparently compiled from the original memoirs, published 1788. See Bibl. Nos. 43 and 47.]
403. GILFORD, HASTINGS: Ateleiosis; a disease characterised by conspicuous delay of growth and development. Plates. *Medico-Chirurgical Transactions*, Vol. LXXXV. pp. 305—359. London, 1902. [Pedigrees Nos. 713, 714 and 718.]
404. RAILTON, T. C.: Sporadic Cretinism. *British Medical Journal*, 1902, Vol. i. pp. 694—695. London, 1902. [Pedigree No. 784.]
405. BALLANTYNE, J. W.: *Manual of Antenatal Pathology and Hygiene*. (The Foetus.) Chap. xix. pp. 338—340. Edinburgh, 1902. [Pedigree No. 638.]
406. KASSOWITZ, MAX: Infantiles, Myxoedem, Mongolismus und Micromelie. Plates. *Wiener medizinische Wochenschrift*, 1902, lxi. Jahrgang, S. 1049—1055, 1105—1112, 1155—1159, 1202—1205, 1256—1261, 1301—1306, 1357—1366, 1409—1415, 1452—1456. Wien, 1902. [Gives a large number of non-adult cases, but no family history.]
407. ESCHER, C.: Zur Frage der angeborenen Rachitis. *Jahrbuch für Kinderheilkunde*, Bd. LIV., or 3 F., Bd. vi. pp. 613—638. Berlin, 1902. [A general discussion on congenital rachitis.]
408. COMBY, JULES: Rickets and Achondroplasia. *British Medical Journal*, 1902, Vol. ii. pp. 955—956. London, 1902. [Pedigree No. 616: see also Bibl. Nos. 409 and 419.]
409. COMBY, JULES: Un cas d'achondroplasia. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xix. pp. 551—552. Paris, 1902. [Pedigree No. 616: see Bibl. Nos. 408 and 419.]
410. MÉRY, H., ET LABBÉ, R.: Sur un cas d'achondroplasia. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xix. pp. 543—551. Paris, 1902. [Pedigree No. 670.]
411. REGNAULT, FELIX: L'Achondroplasia. Plates. *Archives générales de Médecine*, N. S., T. vii. pp. 232—255. Paris, 1902. [Gives a general account of achondroplasia and also of various pictures and statues of dwarfs.]
- 411^b. *JOACHIMSTHAL: Die angeborenen Verbildungen der unteren Extremitäten. *Fortschritte auf dem Gebiete der Röntgenstrahlen*, Erg. Bd. viii. 1902.
412. DURANTE, G.: Contribution à l'étude de l'achondroplasia. *Revue médicale de la Suisse Romande*, T. xxii. pp. 809—826. Genève, 1902. [Pedigree No. 668.]
413. APERT, E.: Le myxoedème et l'achondroplasia sont deux affections totalement différentes. *Comptes Rendus de la Société de Biologie*, T. liv., or 11^e Série, T. iv. pp. 127—129. Paris, 1902. [Discusses the differences of the two diseases.]

414. LANNOIS, M.: Deux cas de nanisme achondroplasique chez le frère et la sœur. *Lyon Médical*, T. xcviii. pp. 893—900. Lyon, 1902. [Pedigree No. 618.]
415. CHRISTOPHER, W. S.: Development the key-note of pediatrics. *Archives of Pediatrics*, Vol. xix. pp. 481—488. New York, 1902. [This is merely an address on pediatrics; there is nothing in it about dwarfs or achondroplasia. The reference is however frequently given in bibliographies; possibly it is intended to refer to the discussion, in which Christopher joined, on Morse's paper (Bibl. No. 416) in same volume.]
416. MORSE, JOHN LOVETT: A case of Chondrodystrophy (*sic*!) Fetalis. *Archives of Pediatrics*, Vol. xix. pp. 561—577. New York, 1902. [In the discussion, Griffith mentions two cases of achondroplasia (p. 575), Holt gives one case (p. 576), and Christopher gives one (p. 577) which he does not think can be cretinism. There is a short bibliography. [Pedigrees Nos. 753 and 825.]
- 416^b. MANOUVRIER, L.: Notes sur quelques prodiges humains exhibés à Paris en 1901. *Revue Mensuelle de l'École d'Anthropologie de Paris*, 12^e année, pp. 11—19. Paris, 1902. [p. 19 gives an account of two dwarfs—(1) Pierre le Grand, height said to be 58 cm., but Manouvrier suggests he was probably a few centimetres taller and says he was a new edition of Bébé, as his head was in proportion to the size of his body; (2) Queen Mab, who was agreeable and intelligent. No height is given. These dwarfs were in Barnum and Bailey's Circus.]
417. PELOQUIN, A.: *De l'achondroplasie chez l'homme et les animaux*. Thèse. 78 pages. Lyon, 1902. [He gives Lannois' Case and one of his own, also a bibliography. Pedigree No. 623.]
418. APERT, E.: Pathogénie et traitement pathogénique des enfants retardataires. *Annales de Médecine et Chirurgie Infantiles*, T. vi. pp. 96—100. Paris, 1902.
419. COMBY, JULES: Un cas d'achondroplasie. *Archives de Médecine des Enfants*, T. v. pp. 473—477. Paris, 1902. [Typical case in boy aged 5½, 85 cm. in stature, no rachitis. Good photographs; discussion of distinction between rickety and achondroplastic individuals, and rickets complicated with achondroplasia.]
420. WOOD, A. JEFFREYS, AND HEWLETT, HERBERT M.: Three Cases of Achondroplasia. *Intercolonial Medical Journal of Australasia*, Vol. vii. pp. 385—394. Melbourne, 1902. [Pedigrees Nos. 641, 642 and 643.]
421. LEBLANC, P.: Achondroplasie et myxoedème. *Comptes Rendus de la Société de Biologie*, T. liv., or 11^e Série, T. iv. pp. 88—89. Paris, 1902. [Merely a note drawing attention to the existence of achondroplasia in animals and associating it with myxoedema.]
422. LEGRY, TH., ET REGNAULT, FELIX: Présence de corps thyroïdes normaux chez les achondroplasiques. *Comptes Rendus de la Société de Biologie*, T. liv., or 11^e Série, T. iv. pp. 567—568. Paris, 1902. [A note stating the thyroid body was found normal in three achondroplastic fetuses.]
423. REGNAULT, FELIX: Différenciation des squelettes de veaux achondroplasiques et natos. *Comptes Rendus de la Société de Biologie*, T. liv., or 11^e Série, T. iv. pp. 1233—1235. Paris, 1902. [A note stating he had differentiated between calves of the achondroplastic type and bull-dog type, which had hitherto been confounded.]
424. JABOULAY, M.: Achondroplasie chez un adulte. *Lyon Médical*, T. xcviii. pp. 281—282. Lyon, 1902. [Account of an achondroplastic female. No family history. No measurements.]
425. CHAMPETIER DE RIBES ET DANIEL, CONSTANTIN: Un cas d'achondroplasie. *Bulletins de la Société Anatomique de Paris*, 6^e Série, T. iv. p. 90. Paris, 1902. [An achondroplastic foetus aged 7½ months. No family history. No measurements.]
426. MÉRY, H.: Sur un cas d'achondroplasie. Laryngite sous-glottique. *Lucas-Champonnière's Journal de Médecine et de Chirurgie pratiques*, T. lxxiii. pp. 90—93. Paris, 1902. [Description of a boy, aged 8, height 96 cm., and brother of five normal children. No further family history.]
427. RIBBERT, HUGO: Fatale Rachitis. *Lehrbuch der speciellen Pathologie und der speciellen pathologischen Anatomie*, pp. 684—685. Plate. Leipzig, 1902. [Short account of the features of the disease with plate of foetal skeleton.]
428. *ALLARIA, G. B.: *Rivista critica di Clinica medica*, No. 5. Firenze, 1902.
429. *ACQUADERNI, A.: Achondroplasia. *Rivista critica di clinica medica*, p. 327, 5 ap. 1902. Firenze, 1902.
- 429^b. SWOBODA, NORBERT: Ein Fall von chondrodystrophischen Zwergwuchs (Achondroplasie). *Wiener klinische Wochenschrift*, xvi. Jahrgang, S. 669—671. Wien, 1903. [Pedigree No. 666.]
430. *PONCET, A.: *La Province médicale*, Jan. 23, 1902. Lyon, 1902.
431. *LEREBoullet, P.: *Les Cirrhoses Biliaires*, p. 76. Paris, 1902.

432. CANTLIE, JAMES: On a case of achondroplasia. *The Polyclinic*, Vol. vi. pp. 120—124. London, 1902. [Description of an achondroplastic girl, with no measurements or family history. Photographs are those in Turner's Case, Bibl. No. 354, but there is no reference.]
433. *VARGAS, M.: Die Achondroplasie. *Monatsschrift für Kinderheilkunde*, S. 67, Nov. 1902. [Case of achondroplasia or chondrodystrophy hypoplastic, complicated with pes varus; radiography showing absence of ossification of epiphyses; general discussion and bibliography.]
434. TAYLOR, J.: A case of Achondroplasia. *Reports of the Society for the Study of Disease in Children*, Vol. III. p. 162. London, 1902—1903. [Pedigree No. 688.]
435. SUTHERLAND, G. A.: Case of Infantilism in a boy aged 10½ years. *Reports of the Society for the Study of Disease in Children*, Vol. III. pp. 192—194. London, 1902—3. [Pedigree No. 798.]
- 435^b. *GHEORGIO, N. Foetus achondroplastique présentant aux mains et aux pieds de la polydactylie: bec-de-lièvre. *Bulletins et mémoires de la Société de Chirurgie de Bucarest*, 1902—3, T. v pp. 13—16. Bucarest, 1902—3.
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- 469^b. APERT, E. Myxoedème fruste, croissance tardive, diabète. *Nouvelle Iconographie de la Salpêtrière*, T. xvii. pp. 1—8. Paris, 1904. Plate. [A man aged 66, height 145 cm., who did not stop growing till he was aged 30. He was obese and had cryptorchism. His limbs were short and hand trident-shaped, but he was not achondroplastic. He was the last of five children; he thought his parents, brother and sisters were all normal. His intelligence was normal.]
470. PERNET, GEORGE: The antiquity of Achondroplasia. *British Journal of the Diseases of Children*, Vol. i. pp. 7—10. London, 1904. [This paper is chiefly about the small Egyptian glazed earthenware statuettes in the British Museum.]
- 470^b. SELIGMANN, C. G.: Congenital Cretinism in Calves (with plates of bones, skulls, etc.). *Transactions, Pathological Society of London*, Vol. 55, pp. 1—20. London, 1904.
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- 471^b. *BRUNEAU DE LABORIE: *Du nanisme nival*. Paris, 1904.
472. LEQUEUX, P.: Un foetus achondroplasique. Présentation de la pièce anatomique, de radiographies et de coupes histologiques. *Bulletin de la Société d'Obstétrique de Paris*, T. vii. pp. 150—153. Paris, 1904. [Pedigree No. 672.]
- 472^b. *VON METTHEIMER, A.: Mikromelie bei einem 7-jährigen Mädchen. III. *Versammlung der Vereinigung süd-deutscher Kinderärzte*, 11 Dez. 1904. Frankfurt am M. 1904.
473. *MUGGIA, A.: Su un caso di acondroplasia. *La Pediatria*, 2. Ser., T. II. pp. 260—276. Napoli, 1904. [Girl of 12 years, height 103 cm., micromelia, *mains en trident*, parents healthy, thyroid treatment no effect; normal intelligence.]
474. LEPAGE, G.: Opération césarienne chez une primipare achondroplasique. Enfant vivant présentant des déformations achondroplasiques. Plates. *Comptes Rendus de la Société d'Obstétrique, de Gynécologie et de Pédiatrie*, T. vi. pp. 270—278. Paris, 1904. [Pedigree No. 614. In the discussion which followed Lepage's paper Potocki mentioned Guéniot's Case (Bibl. No. 289), at which he had assisted, and gave some later details of the family. Pedigree No. 613.]
475. NATHAN, P. W.: Chondrodystrophia foetalis. Plate. *American Journal of Medical Sciences*, Vol. cxxvii. pp. 690—702. Philadelphia and New York, 1904. [A general paper on the subject read before the Orthopaedic Section of the New York Academy of Medicine, Oct. 16, 1903.]
- 475^b. COMBY, J.: Nouveaux cas d'achondroplasie. *Archives de Médecine des Enfants*, T. vii. pp. 541—547. Paris, 1904. [The first of the three cases is that of Bibl. No. 419; the second of a female child of 14 months, with good photograph and excellent radiograph of hands (*mains en trident* and absence of cartilaginous ossification); the third a boy of $4\frac{1}{2}$ years, height 84 cm., parents and two siblings normal and well proportioned. The author draws attention to the two classes of achondroplasia of Kaufmann, *forme hypoplastique*, for those cases which indicate an arrest of cartilaginous ossification, and *forme hyperplastique* for those which show a too precipitated ossification: see above, p. 372.]
476. MATSUOKA, M.: Beitrag zur Lehre von der fötalen Knochenerkrankung. Plate. *Deutsche Zeitschrift für Chirurgie*, Bd. Lxxii. S. 428—444. Leipzig, 1904. [A general discussion of the subject.]
- 476^b. *BREUS UND KOLISKO: Die pathologischen Beckenformen. Wien und Leipzig, 1904.
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- 479^b. WEIGANDT, W.: Der heutige Stand der Lehre von Kretinismus. *Sammlung zwangloser Abhandlungen aus dem Gebiete der Nerven und Geistes Krankheiten*, Bd. iv. Heft 6—7. Halle, 1904. [Discussion on cretinism and infantile myxoedema, with exception of S. 65, photograph and account of a female rachitic dwarf, height 101 cm., and S. 66, photograph and account of an achondroplastic male dwarf, height 123.2 cm. No family history. Photographs of cretins.]
480. *LÉVI, L., ET BOUCHACOURT, L.: Radiographies de foetus achondroplasies. *Revue d'hygiène et de médecine infantile*, T. iii. pp. 514—528. Paris, 1904.
- 480^b. THOMSON, JOHN: Two Cases of Infantilism. *Transactions of the Medico-Chirurgical Society of Edinburgh*, N.S. Vol. 23, pp. 165—166. Edinburgh, 1904. [These cases were diagnosed as cases of pancreatic infantilism. (1) Youth aged $24\frac{1}{2}$ years, height $51\frac{1}{2}$ in. He was very intelligent. The genital organs were infantile. He was first seen by Thomson in 1894 and under treatment he grew $2\frac{1}{2}$ in. between 15 and $17\frac{1}{2}$ years of age, 3 in. in the next 5 years and since then had not grown $\frac{1}{4}$ in. (2) Youth aged $17\frac{1}{2}$, height $49\frac{1}{2}$ in., with infantile genitalia; he had just been placed under Byrom Bramwell for treatment.]
481. BRAMWELL, BYROM: Pancreatic Infantilism; remarkable improvement (growth of body and sexual development) as the result of administration of pancreatic extract. *Clinical Studies*, Vol. ii. pp. 346—348. Edinburgh, 1904. *Scottish Medical and Surgical Journal*, Vol. xiv. pp. 321—324. Edinburgh, 1904. *Clinical Studies*, N. S. Vol. iii. pp. 172—174, 1905.
- 481^b. BRAMWELL, BYROM: Achondroplasia. *Clinical Studies*, Vol. ii. pp. 346—348. Edinburgh, 1904. [An account of Thomson's Case, Bibl. No. 367, with some measurements.]
482. TOLLEMER: Nanisme pseudo-myxoedème. *Le Progrès médical*, 3^e Série, T. xxi. p. 433. Paris, 1905. [A dwarf child, aged 7, with normal brothers and sisters. Its intellectual faculties were normal. No thyroid gland could be felt. No family antecedents.]
483. BRAMWELL, BYROM: Achondroplasia. *Clinical Studies*, N. S. Vol. iii. Pt. ii. pp. 174—175. Edinburgh, 1905. [Pedigree No. 680.]
484. MILLER, D. J. M.: Chondrodystrophy (*sic!*) foetalis (Achondroplasia). *American Journal of Medical Sciences*, Vol. v. 130, N. S., pp. 30—36. Philadelphia-New York, 1905. [Pedigree No. 644.]
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486. HORAND, RÉNÉ: Chondrodystrophie ou achondroplasie et nanisme dysthyroïdien myxoedémateux. *Lyon Médical*, T. civ. pp. 926—933. Lyon, 1905. [Pedigrees Nos. 655 and 838.]
487. HEIMAN, HENRY: A case of achondroplasia. *Archives of Pediatrics*, Vol. xxii. pp. 842—846. New York, 1905. [Pedigree No. 754.]
488. PARIHON, C., SHUNDA, ATH., ET ZALPLACHTA, Z.: Sur deux cas d'achondroplasie. *Nouvelle Iconographie de la Salpêtrière*, T. xviii. pp. 539—559. Paris, 1905. [Pedigree No. 656.]
489. *PORAK, C., ET DURANTE, G.: Les dystrophies osseuses congénitales. *Rapport de la Séance annuelle de la Société Obstétricale de France*, avril, 1905. [See No. 491.]
490. DURANTE, G.: Nains achondroplasiques et nains rachitiques. *Académie de Médecine*, 1905; *La Presse médicale*, 13^e année, p. 280. Paris, 1905. [Short account of Durante's paper at Académie de Médecine, mai 2, 1905, on difference of two kinds of dwarfs. See Bibl. No. 491.]
491. PORAK, C., ET DURANTE, G.: Les micromélies congénitales. Achondroplasie vraie et dystrophie périostale. *Plates. Nouvelle Iconographie de la Salpêtrière*, T. xviii. pp. 481—539. Paris, 1905. [A general account of achondroplasia with bibliography. See also Bibl. No. 490.]
- 491^b. PORAK, C. Présentation de deux squelettes de naines provenant de la Maternité. *Société obstétricale de France*, 27—29 avril, 1905. *La Presse médicale*, 1905, 13^e année, p. 279. Paris, 1905. [A notice of two dwarf skeletons presented at the séance of the Société Obstétricale de France. The one was achondroplastic, the other rachitic.]
- 491^c. DURANTE, G.: Nouveaux faits d'achondroplasie. *La Presse médicale*, 1905, 13^e année, p. 279. Paris, 1905. [A short note on a paper read before the Société obstétricale de France. Attention is drawn to the fact that many different affections are classed under achondroplasia merely because of the shortness of the extremities.]

492. SEVESTRE: Sur un cas de l'achondroplasie. *Bulletins de l'Académie de Médecine*, 3^e Série, T. LIII. pp. 574—577. Paris, 1905. Also *La Presse médicale*, 1905, 13^e année, p. 360. Paris, 1905. [He examined another member of the family in Pedigree No. 612.]
493. LAUNOIS, P. E., ET APERT, E.: Achondroplasie héréditaire. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xxii. pp. 606—613. Paris, 1905. [Pedigree No. 615.]
- 493^b. *LAUNOIS, P. E., ET APERT, E.: L'hérédité de l'achondroplasie chez l'homme et chez les animaux. *Bulletins de la Société de Pathologie comparée*, T. xii. p. 19. Paris, 1905. [This gives an account of case described in Bibl. No. 493.]
494. LEPAGE, G.: Un cas d'achondroplasie chez un fœtus extrait par opération césarienne chez une femme achondroplasique. *Revue d'Orthopédie*, 2^e Série, T. vi. pp. 109—118. Paris, 1905. [Pedigree No. 614: see Bibl. No. 474.]
495. *MICHAEL, MAY: A case of achondroplasia. *Women's Medical Journal*, Vol. xv. p. 75. Toledo, U.S.A., 1905.
496. NOBÉCOURT ET PAISSEAU: Un cas d'achondroplasie fruste. *Annales de Médecine et Chirurgie infantiles*, T. ix. pp. 413—418. Paris, 1905. [Gives an account of a girl aged 12, height 1288 mm. The cranial portion of her head was large, the face small. The peculiarity of the patient consisted in the fact that the arms were normal in dimensions while the legs were short, and, though not curved, exhibited an appreciable degree of genu valgum.]
497. *PARACHE: Un caso de acondroplasia. *Revista de medicina y cirugía practicas (nacional y extranjera)*, T. LXVI. pp. 281—283. Madrid, 1905.
- 497^b. *LUGANO: Sul cretinismo sporadico. *Rivista di Pat. nerv. e ment.*, 1905.
498. THIBAUT, A.: Note sur un cas d'achondroplasie. *Angers Médical*, T. xii. pp. 6—10. Anjou, 1905. [Eugenie R., aged 40 years, normal parents, 10 siblings all dead; mother attributed dwarfism to maternal impression, having frequently seen, during her training as *sage femme* at Angers, the picture of a dwarf in the lecture-room. Height 132 cm., trunk average size. E. R. at 32 became pregnant, and child delivered by Caesarian operation died at four days.]
499. *VARIOT, G.: Achondroplasie, son traitement. *Journal de Médecine interne*, T. ix. p. 109. Paris, 1905.
500. *VARIOT, G.: L'achondroplasie. *Revue générale de clinique et de thérapeutique*, T. xix. p. 487. Paris, 1905.
- 500^b. *BERNSTEIN, S. L.: Achondroplasia. *Cleveland Medical Journal*, Vol. vii. pp. 12—18. Cleveland, U.S.A., 1905.
501. JOSEPH, H. M.: Chondrodystrophia foetalis or Achondroplasia. *The Lancet*, 1905, Vol. ii. p. 217. London, 1905. [Measurements and description of a girl, aged 3 years and 11 months, height 75 cm. No family history.]
502. CHAVIGNY: Achondroplasie partielle. *Lyon Médical*, T. civ. pp. 1252—1253. Lyon, 1905. Also **Bulletins de la Société Médicale des Hôpitaux de Lyon*, T. iv. p. 228. Lyon, 1905. [Description of a soldier with hands of the achondroplastic type.]
503. SALOMON, P.: Description d'un fœtus achondroplasique. *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, 5^e Série, T. vi. pp. 303—308. Paris, 1905. [The subject of this observation was a still-born male child preserved since 1864 in the Dareste Collection, and known as "Le Phocomèle."]
504. SINNETAMBY, M.: A case of Achondroplasia in which Caesarian section was successfully performed. *Journal of the Ceylon Branch of the British Medical Association*, Vol. ii. Pt ii. pp. 72—75. Colombo, 1905. [Pedigree No. 679.]
505. NAU: Le rachitisme congénital. **Rapport de la Séance annuelle de la Société obstétricale de France*. *La Presse médicale*, 1905, 13^e année, p. 279. Paris, 1905. [Notice of Nau's paper. He stated that the study of intra-uterine rachitis was based on those cases which are not classed under achondroplasia.]
506. VERNEAU, B.: Les pygmées et les nains achondroplasiques. **Rapport de la Séance annuelle de la Société obstétricale de France*, 1905. *La Presse médicale*, 1905, 13^e année, p. 280. Paris, 1905. [Notice of Verneau's paper in which he discusses whether the pygmy races are achondroplastic or not and denies the heredity of achondroplasia.]
507. *PORAK, C.: Pseudo-achondroplasie: opération de Gigli; mère et enfant bien portants. Plate. *Bulletin de la Société d'Obstétrique de Paris*, T. viii. pp. 113—115. Paris, 1905.
- 507^b. *RONDEAU: Les rapports du rachitisme congénital et de l'achondroplasie. Thèse. Paris, 1905.

508. FUCHS, EMIL: Vier Falle von Myxodem nebst Beiträgen zur skiagraphischen Differential-diagnose der verschiedenen Formen verzögerten Längenwachstums. *Archiv für Kinderheilkunde*, Bd. xli. S. 60—81. Stuttgart, 1905. [Title indicates subject.]
509. SMITH, G. ELLIOT: Notes on African Pygmies. *The Lancet*, 1905, Vol. ii. pp. 425—431. London, 1905. [An account with measurements (some clearly erroneous) of six pygmies brought to Cairo by Colonel Harrison from the Ituri Forest.]
510. VERON: Un nouveau-né pseudo-achondroplasique rachitique (avec examen histologique). **Obstétrique*, T. x. pp. 235—242. Paris, 1905. *La Presse médicale*, 1905, 13^e année, p. 279. Paris, 1905. [A notice of Veron's paper. His case was a child whose mother had slight traces of rachitis. Length 43 cm. Weight 2500 grammes. It had short thick-set limbs, and the radiographs showed short thick incurved bones.]
511. FUCHS, EMIL: Ein Beitrag zur Kasuistik der Mikromelie mit drei Abbildungen. *Archiv für Kinderheilkunde*, Bd. xli. S. 380—383. Stuttgart, 1905. [Description of a man, aged 26, height 127 cm., with very short limbs.]
512. DURANTE, G.: Achondroplasie et rachitisme. *La Semaine médicale*, 1905, 25^e Année, p. 213. Paris, 1905. [A short notice of a paper by Durante on achondroplasia and rachitis. See Bibl. No. 490.]
513. CALWELL, WM.: Observations on Dwarfism and Infantilism. *British Medical Journal*, 1905, Vol. i. pp. 1376—1378. London, 1905. [He showed two cases and a skeleton. (1) Male aged 21, height 4 ft. 4½ in., weight 7 st. 7½ lbs. He had no hair or only slight traces of it on face, axillae or pubis. Hair of head was turning grey. The relative length of the limbs to the body was about normal. Calwell calls it a case of infantilism, ateleiosis or arrested development with signs of progeria. (2) Female aged 26, height 3 ft. 8 in., weight 3 st. 10 lbs. She had excessive scoliosis with some lordosis. The upper limbs were as long as those of a woman of normal height, the lower limbs much bent. She was a dwarf from deformity. (3) Skeleton of the achondroplastic type. Illustrations are given.]
- 513^b. HEKTOEN, LUDWIG: Body of a dwarf with short limbs. *Transactions of the Chicago Pathological Society*, 9 April, 1906, p. 443. Reference in *Revue Neurologique*, T. 14, p. 949. Paris, 1906. [Morphological description of the corpse of an achondroplastic actor and singer who died of pneumonia.]
514. THOMSON, JOHN: Achondroplasia. *Green's Encyclopaedia and Dictionary of Medicine and Surgery*, Vol. i. pp. 38—40. London, 1906. [Article on the subject.]
515. DECROLY, M. O.: Cas d'achondroplasie héréditaire et familiale. *Société Royale des Sciences Médicales et Naturelles de Bruxelles. Bulletin des Séances*, 64^e Année, pp. 2—27. Bruxelles, 1906. [Pedigree No. 622.]
516. HERRGOTT, ALPHONSE: Du nanisme au point de vue obstétrical. Achondroplasie familiale, opérations césariennes. *Annales de Gynécologie et d'Obstétrique*, 2^e Série, T. iii. pp. 1—18. Paris, 1906. [Pedigree No. 625.]
517. AUCHÉ: Achondroplasie chez un enfant de trois ans. *Gazette hebdomadaire des Sciences médicales de Bordeaux*, T. xxvii. pp. 116—117. Bordeaux, 1906. Also *Journal de Médecine de Bordeaux*, 36^e année, p. 67. Bordeaux, 1906. [Pedigrees Nos. 649 and 755.]
- 517^b. CURTIS, M., ET SALMON, J.: Un nouveau cas de Phokomélie avec étude histologique du système osseux. *Comptes Rendus de la Société de Biologie*, T. lx. année 1906, 1^{er} Semestre, pp. 1058—60. [Title describes subject.] Paris, 1906.
518. RANKIN, GUTHRIE, AND MACKAY, ERNEST C.: Achondroplasia. *Medico-Chirurgical Transactions*, Vol. 89, pp. 395—418. London, 1906. *Pediatrics*, Vol. 19, pp. 77—88. New York, 1907. *British Medical Journal*, 1906, Vol. i. pp. 1518—1522. London, 1906. [Pedigree No. 658.]
519. DUFOUR, HENRI: Achondroplasie partielle, forme atypique. *Nouvelle Iconographie de la Salpêtrière*, T. xix. pp. 133—135. Paris, 1906. [Pedigree No. 752.]
520. HAUSHALTER: Un cas de nanisme achondroplasique. *Comptes Rendus de la Société de Biologie*, T. lx. p. 1079. Paris, 1906. [A short description of an achondroplastic girl, aged 19 months. No measurements and no family history.]
521. EMANUEL: Achondroplasia. *British Medical Journal*, 1906, Vol. ii. p. 1305. London, 1906. [Description of a boy, aged 8, without measurements or family history.]
522. *POUJOL, J.: Sur un cas de nanisme (rachitisme et achondroplasie) chez un Musulman algérien. *Bulletin médical de l'Algérie*, T. xvii. pp. 37—41. Alger, 1906.
- 522^b. *BERGRATH: Ueber Chondrodystrophia foetalis. Inaug. Diss. Bonn, 1906.

523. BIRCHER: Zwei Fälle von Chondrodystrophie. *Correspondenz-Blatt für Schweizer Aerzte*, Bd. xxxvi. S. 467. Basel, 1906. [Description of a male aged 16, and a female aged 24, without measurements or family history.]
524. LE LORIER: Un foetus achondroplasique [Rapport de P. Rudaux]. *Comptes Rendus de la Société d'Obstétrique, de Gynécologie et de Pédiatrie de Paris*, T. viii. pp. 127—128. Paris, 1906. After reporting Le Lorier's Case Rudaux gave a case of his own. [Pedigrees Nos. 671 and 676.]
525. BONNET-LABORDERIE ET GORISSE: Note sur un cas d'achondroplasie observé chez un nouveau-né. *Journal des Sciences Médicales de Lille*, 1906, T. i. pp. 25—32 and p. 278. Lille, 1906. [A female infant, second child of an apparently healthy mother aged 39; the father was aged 60. The mother insisted that she had been greatly frightened by a drunken man in the 4th month of her pregnancy. The child was a typical achondroplastic with micromelia of the rhizomelic type. The total length was 44 cm. She had clubfoot (varus equinus). The authors discuss the probable causes of achondroplasia. p. 278 gives a note by M. Duret on the above case. He thinks that the age of the parents in this case played a part in the etiology of the disease.]
526. KEYSER, C. R.: Achondroplasia; its occurrence in men and animals. *The Lancet*, 1906, Vol. i. pp. 1598—1602. London, 1906. [Gives some particulars of 34 collected cases of achondroplasia. In one of his own cases the father was only 4 ft. 8 in. tall, the mother normal. Pedigree No. 667.]
527. POYNTON, F. J.: Achondroplasia. *Transactions of the Medical Society*, Vol. xxix. pp. 431—432. London, 1906. [Pedigree No. 663.]
528. PARHON, C., UND MARBE, S.: Die Achondroplasie (mit zwei neueren Beobachtungen von Achondroplasie beim Erwachsenen. **Revista Stiintelor medicale*, No. 7, 1906. Reported in *Münchener medizinische Wochenschrift*, 1906. Jahrgang LIII. No. 31, p. 1540. München, 1906. [A notice of the article in the above Roumanian journal in which the authors contend that dwarf growth depends on a disturbance of the functions of the glands associated with internal secretions.]
529. DIETERLE, THEOPHIL: Die Athyreosis unter besonderer Berücksichtigung der dabei auftretenden Skelettveränderungen, sowie der differential-diagnostisch vornehmlich in Betracht kommenden Störungen des Knochenwachstums. Untersuchungen über Thyreoaplasie, Chondrodystrophia foetalis und Osteogenesis Imperfecta. *Virchow's Archiv*, Bd. 184, S. 56—122. Berlin, 1906. 5 Textfiguren und Tafeln II, III, IV. [In two chapters. I. Die Athyreosis (kongenitales Myxoedem). II. Die foetalen Skeletterkrankungen. This chapter is on Chondrodystrophia foetalis and Osteogenesis Imperfecta. He concludes that no form of diseases of the skeleton can be attributed (kann zurückgeführt werden) to disturbance of the functions of the thyroid body.]
530. HAY, KENNETH R.: A Case of Achondroplasia. *Reports of the Society for the Study of Disease in Children*, Vol. vi. pp. 197—198. London, 1906. [A boy aged 2, his body was long relatively to the limbs. The humerus and ulna each measured $3\frac{3}{4}$ inches, the femur measured $4\frac{3}{8}$ inches. The father was phthisical and subject to fits, the mother was not robust. There was a younger child aged 4 months who was apparently normal.]
531. *CERLETTI: Effetti delle iniezioni del succo d'ipofisi sull' accrescimento somatico. *Reale Accademia dei Lincei Roma*: 15 luglio e 5 agosto. Roma, 1906.
532. PORTER, J. HOUSTON: Achondroplasia. Notes of three Cases. *British Medical Journal*, 1907, Vol. i. pp. 12—14. London, 1907. [Pedigree No. 619.]
533. LITCHFIELD, W. F.: A case of Achondroplasia. *Australasian Medical Gazette*, 1907, Vol. xxvi. pp. 624—625. Sydney, 1907. [Pedigree No. 624.]
534. POYNTON, F. J.: Achondroplasia. *Allbutt and Rolleston's System of Medicine*, 3rd edition, Vol. III. pp. 117—123. London, 1907. [An article on achondroplasia with bibliography.]
535. RANKIN, G., MACKAY, E. C., LUNN, J. R., AND CRANKE, J.: Achondroplasia, with notes of cases. Plates. *British Medical Journal*, 1907, Vol. i. pp. 11—12. London, 1907. [Gives descriptions of three cases; one described under Cranke's name, one under Rankin and Mackay's, previously described (Bibl. No. 518), and the third Lunn's Case. A man aged 53, height not given, no family history. Probably this last is same case as in Bibl. No. 536. Pedigree No. 681.]
536. LUNN, JOHN R.: Achondroplasia. *Transactions of the Clinical Society*, Vol. XL. pp. 252—253. London, 1907. [Pedigree No. 665.]
537. MACEWEN, J. C.: A case of Achondroplasia. *British Medical Journal*, 1907, Vol. II. pp. 1646—1647. London, 1907. [Pedigree No. 657.]
538. SCHMOLCK: Mehrfacher Zwergwuchs in verwandten Familien eines Hochgebirgstaales. *Virchow's Archiv*, Bd. CLXXXVII. S. 105—110. Berlin, 1907. [Pedigree No. 689.]

539. LANGENBACH, E.: Ein Fall von Chondrodystrophia foetalis mit Asymmetrie des Schadels. *Plates. Virchow's Archiv*, Bd. CLXXXIX. S. 12—17. Berlin, 1907. [Description of a skeleton, length 47 cm. No family history.]
540. VARIOT, G.: Analogie des troubles de l'ossification dans le myxoedème et dans l'achondroplasie. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xxiv. pp. 59—66. Paris, 1907. [See also No. 542.]
541. BRISSAUD, E., ET BAUER: Un cas d'infantilisme "réversif" avec autopsie. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xxiv. pp. 39—41. Paris, 1907. [Case of a female, who reached adult age normally, and some time after pregnancy signs of infantilism became pronounced. The autopsy showed a small thyroid body and small genital organs. Nothing is stated as to stature.]
542. VARIOT, G.: Note sur les troubles de l'ossification dans l'achondroplasie étudiés par la radiographie. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xxiv. pp. 128—129. Paris, 1907. [See also No. 540.]
543. VOISIN, JULES, ET VOISIN, ROGER: Troubles de l'ossification dans le myxoedème et l'achondroplasie. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 3^e Série, T. xxiv. pp. 73—76. Paris, 1907. [Title describes subject.]
544. BROCA, A., ET DEBAT-PONSAN, J.: Un cas d'achondroplasie. *Plate. Bulletins de la Société de Pédiatrie de Paris*, T. ix. pp. 91—94. Paris, 1907. [Girl aged 8, parents and sister normal, height 90.6 cm. She appeared normal at birth, growth stopped at age of 3, then from Jan. 1906 to Feb. 1907, she grew 10 cm. She was a typical case of achondroplasia.]
545. REYHER, P.: Zur Kenntniss der Chondrodystrophia foetalis mit 4 Abbildungen. *Charité Annalen*, Jahrgang xxxi. S. 129—145. Berlin, 1907. Also *Berliner klinische Wochenschrift*, Jahrgang xlv. S. 1423. Berlin, 1907. [Pedigrees Nos. 774 and 776.]
546. FREIBERG, ALBERT H.: Defect of both femoral heads in a chondrodystrophic dwarf. *The American Journal of Orthopedic Surgery*, Vol. iv. pp. 184—189. Philadelphia, 1906—1907. [A girl aged 15, first child of her mother, height 48 inches. The trunk appeared disproportionately large for the arms and legs. Skiagrams showed the absence of the femoral head. There is a full account of the deformity and a discussion as to whether the case is one of chondrodystrophy or not.]
547. MEIGE, HENRY, ET FEINDEL, E.: Achondroplasie de l'adulte. *Pratique Médico-Chirurgicale*, T. i. pp. 52—55. Paris, 1907. [A short article on the main features of achondroplasia.]
548. BOUFFE DE SAINTE-BLAISE: Nouveau-né (Pathologie). Rachitisme intra-utérin. Achondroplasie ou rachitisme foetal. *Pratique Médico-Chirurgicale*, T. iv. p. 604. Paris, 1907. [A short article on intra-uterine rachitis.]
549. MEIGE, HENRY: Nanisme. *Pratique Médico-Chirurgicale*, T. iv. pp. 457—458. Paris, 1907. [A short article on the different kinds of dwarfism.]
550. FEINDEL, E.: Infantilisme. *Pratique Médico-Chirurgicale*, T. iii. pp. 869—876. Paris, 1907. [Article on the different kinds of Infantilism.]
551. SPICER, SCANES: A Case of Achondroplasia in a child aged three years. *Journal of Laryngology, Rhinology and Otology*, N.S., Vol. xxii. pp. 57—59. London, 1907. [Pedigree No. 687.]
552. HORHOUSE, E.: A Case of (?) Achondroplasia. *British Medical Journal*, 1907, Vol. ii. pp. 85—86. London, 1907. [A girl aged 5½, family history nil. She had some rickety stigmata, but showed in addition peculiar features. The femora were bowed and very short. Length of femur 7¾ inches, length of tibia 6¼ inches. The arms were short as compared with the body.]
553. CLARKE, H. H.: Chondrodystrophia foetalis. *The Liverpool Medico-Chirurgical Journal*, Vol. xxvii. No. 52, pp. 219—228. London, 1907. 4 Plates. [A short general account of chondrodystrophia foetalis is given with a detailed description of his own case. The child was born alive but died 20 minutes later. No family history.]
554. GUNDLACH, J.: Achondroplasia. *St Bartholomew's Hospital Reports*, Vol. 42, 1906, p. 187. London, 1907. [A still-born female achondroplastic foetus was presented to the Museum by Gundlach; extremities characteristically stunted. The mother, aged 25, was a primipara.]
555. GRIST, EMIL S.: Chondrodystrophia Foetalis. *The American Journal of Orthopedic Surgery*, Vol. v. pp. 240—248. Philadelphia, 1907—8. [A general discussion on achondroplasia with a case of his own, a female infant aged 14 months, height 61 cm. It was the first child of well-proportioned Roumanian parents. Full measurements are given.]
556. *HEGAR: Entwicklungsstörungen, Fotalismus und Infantilismus. *Münchener medizinische Wochenschrift*, 1907, S. 737. Munchen, 1907. [Reference wrong, paper not found: see, however, Heger's *Beiträge zur Geburtshilfe*, Bd. x. Heft 2, 1906, and Bd. xii. Heft 1, 1907. Leipzig.]

557. POISSON : Un cas très curieux de nanisme. *Gazette médicale de Nantes*, 2^e Série, T. xxv. pp. 210—212. Nantes, 1907. [A case of ateleiosis. A male dwarf, height 134 cm., admirably proportioned and without any deformity. He was very intelligent, belonging to a profession which required full possession of the mental faculties. But the sexual organs and sexual instinct were atrophied. It states that M. Sourdille had seen a similar case, in which the generative functions were normal.]
558. COMBY, JULES : Nouveau cas d'achondroplasie. *Archives de Médecine des Enfants*, T. x. pp. 349—352. Paris, 1907. [A girl aged 16 months, only child of normal parents ; the father was aged 28, the mother 29. She was an 8 months' child. Height 55 cm. The limbs were very short, with the upper and lower segments of equal length. She died of hypothermia. It is stated that the diagnosis was very difficult, but that rachitis, mongolian idiocy and congenital myxoedema were excluded. Skiagrams are given.]
559. CHAUMIER ET TATY : Confusion mentale chez un achondroplase, glycosurie, acetonurie. xvii^e Congrès des Médecins Aliénistes et Neurologistes de France et des Pays de langue française, Geneva-Lausanne, 1—7 août, 1907. *Le Bulletin médical*, T. xxi. Pt 2, p. 713. Paris, 1907. [An achondroplasic man, aged 28, suffered from polydipsia and took to drink. He became mentally affected and attempted suicide but when the glycosuria and acetonuria were cured under treatment, he recovered. The authors state that his hereditary antecedents support the theory that tuberculosis plays an important part in the genesis of achondroplasia, but no details are given in this report of the paper.]
560. PAPILLON : Achondroplasie ou rachitisme. *Le Bulletin médical*, T. xxi. p. 1121. Paris, 1907. [Three children were shown at the Société de Pédiatrie 17 déc. 1907, two of whom were achondroplasic. The eldest, a girl aged 8, was radiographed. The third child was a less typical case as the skull was normal.]
561. MILLS, ALBERT : Sur un cas de nanisme généralisé, aplasie partielle, disséminée. *Clinique*, T. xxi. pp. 161—164. Bruxelles, 1907. [A child, aged 2 days, whose length and weight were much below the normal. It appeared well proportioned, all parts of its body exhibited arrested development in varying but symmetrical degrees. The sexual organs showed not only arrested development but were also abnormal. Superficially it appeared to be of the female sex. The right hand had a supplementary finger, with syndactyly. It had clubfoot (talus valgus) on both sides. It died a few hours after examination and an autopsy could not be performed. The father was healthy and had healthy children by his first marriage. The mother had always miscarried previously.]
562. GUÉRIN-VALMALE : Bassin rachitique, opération césarienne. *Société des Sciences Médicales de Montpellier*, 14 déc. 1906. Rapporté dans *La Gazette des Hôpitaux de Toulouse*, 1907. [A primipara aged 32, height 120 cm. She was very deformed. Caesarian section was performed and a living child extracted. Both mother and child lived.]
563. CHARON, DEGOUY ET TISSOT : Un cas d'Achondroplasie. *Nouvelle Iconographie de la Salpêtrière*, T. xx. pp. 390—395. Paris, 1907. 4 Plates. [Pedigree No. 678.]
564. CAVAZZINI, A. : Sur la Pathogénie de l'Achondroplasie. *La Pédiatrie Pratique*, 1907, v^e année, pp. 125—130. Lille, 1907. Also **La Pédiatria*, 2^a Serie, T. v. pp. 168—178. Napoli, 1907. [A boy aged 6. Parents and two sisters normal. He had very short limbs, the upper segments being shorter than the lower. At age of 3 his height was about 66 cm. He was electrically treated, massaged and his limbs stretched by weights; in 4 months he had grown 9 cm. When seen in 1906 his height was 90 cm. The special point of interest in his case was that his mother before and during her pregnancy with this child had consumed a large quantity of thyroid tablets to make herself thin.]
565. APERT, E. : La dysthyroïdie bénigne chronique. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, 24^e année, pp. 528—538. Paris, 1907. [This paper is on infantilism and myxoedema and the effects of thyroid treatment on growth ; some cases are described.]
566. APERT, E. : L'Achondroplasie, maladie héréditaire-familiale et les autres dysostoses familiales. *Maladies familiales et maladies congénitales*, Chap. vi. pp. 95—126. Paris, 1907. [A general discussion on achondroplasia in human beings and animals, its origin and the affections which must be distinguished from achondroplasia.]
567. *SCHIRMER, K. H. : Achondroplasie (Chondrodystrophia foetalis). Mikromelie. *Centralblatt f. d. Grenzgeb. d. Medizin und Chirurgie*, Bd. x. S. 641 and 689. Jena, 1907.
568. *PELIZZI : Dell' Infantilismo. *Annali di Freniatria*, 1907.
569. *BERGHINO : Sopra un caso di Achondroplasia. vi^o Congresso italiano di Pediatria, 2—5. Oct. 1907.

570. BOWLBY, ANTHONY A. : Achondroplasia. *Surgical Pathology and Morbid Anatomy*, 5th edition, pp. 320—322. London, 1907. [A few remarks on achondroplasia, with an illustration taken from Thomson's paper in the *Edinburgh Medical Journal*, Bibl. 281.]
571. FRUHINSHOLZ, A., ET MICHEL, GASTON : Opération de Porro chez une femme achondroplasique, césariotomisée pour la quatrième fois. *Annales de Gynécologie et d'Obstétrique*, 2^e Série, T. iv. pp. 23—28. Paris, 1907. [A woman aged 31 had had six pregnancies and the paper gives an account of the seventh. The first and second accouchements were terminated by basiotripsia, the third, fourth and fifth by caesarian section, the sixth by a miscarriage, the seventh by Porro's operation, a girl weighing 2935 grammes being extracted. In this last operation the uterus was also removed. Only a few uterine measurements are given.]
572. *BOULENGER : Idiotie et Achondroplasie. *Journal de Neurologie*, No. 13, 1907. [Account of an achondroplastic idiot.]
573. *WIENCKE : Chondrodystrophie als Ursache der Phokomelie. *Munchener medizinische Abhandlungen*, Erste Reihe, Heft 31. München, 1907. (Arbeiten aus d. Path. Institut.)
574. MACKENZIE, HECTOR : Cretinism : Synonyms—Cretinoid Idiocy, Infantile Myxoedema, Cretinismus, Crétinisme, Pachydermic Cretinoids, Cachexia Pachydermica. *Albutt and Rolleston's System of Medicine*, Vol. iv. Pt 1. pp. 333—344. London, 1908. [A short article on cretinism, pp. 337—339, gives average stature and general appearance of cretins. There is a bibliography.]
575. DRYSDALE, J. H., AND HERRINGHAM, W. P. : An undescribed form of dwarfism associated with a spatulate condition of the hands. *Quarterly Journal of Medicine*, 1908, Vol. i. No. 2, pp. 193—197. Oxford and London, 1908. [Pedigree No. 704.]
576. THOMSON, JOHN : Achondroplasia (Chondrodystrophia foetalis). *Guide to the Clinical Examination and Treatment of Sick Children*, pp. 488—492. Edinburgh and London, 1908. [On the clinical features, etc., of achondroplasia.]
577. THOMSON, JOHN : Infantilism. *Albutt and Rolleston's System of Medicine*, Vol. iv. Pt 1. pp. 486—492. London, 1908. [An article on infantilism and its possible causes.]
578. REGNAULT, FELIX : Enfoncement de la base du crâne (platybasie) chez une achondroplase. *Bulletins de la Société anatomique de Paris*, 6^e Série, T. ix. pp. 439—440. Paris, 1908. [Description of the skull of an achondroplastic female with platybasia. He says this malformation though often found in rickets had not been found before in achondroplasia.]
579. REGNAULT, FELIX : Anomalies des plis de la main dans l'achondroplasie et la dysostose. *Bulletins de la Société anatomique de Paris*, 6^e Série, T. ix. pp. 439—440. Paris, 1908. [Title describes subject.]
580. PLANCHU : Foetus pseudo-achondroplasique (dysplasie périostale de Porak et Durante). Réunion obstétricale de Lyon, 19 fév. 1908. *Bulletins de la Société d'Obstétrique de Paris*, T. xi. pp. 106—110. Paris, 1908. *L'Obstétrique*, 1908, p. 387. Paris, 1908. *La Presse médicale*, 1908, p. 141. Paris, 1908. [Presentation of the skeleton of a foetus, length 38 cm. The trunk was normal, head nearly normal, the limbs short with the long bones fractured. The mother, aged 32, had at 18 undergone partial thyroidectomy. She had had three normal children who died in infancy.]
581. TRILLAT : Achondroplasie foetale, difficultés du palper pendant la grossesse. Réunion obstétricale de Lyon, 16 avril, 1908. *Bulletins de la Société d'Obstétrique de Paris*, T. xi. pp. 183—185. Paris, 1908. Also *L'Obstétrique*, 1908, No. 4, p. 392. Paris, 1908. [A similar case to that of Planchu, Bibl. No. 580, a female foetus, firstborn child, length 36 cm. weight 1850 grammes. It showed all the characteristics of pseudo-achondroplasia, with arrested development of the limbs and absence of ossification of the bones of the vault of the skull. The mother, aged 30, was normal.]
582. GONNET : Un cas de pseudo-achondroplasie, type dysplasie périostale. Réunion obstétricale de Lyon, 16 avril, 1908. *Bulletins de la Société d'Obstétrique de Paris*, T. xi. p. 185. Paris, 1908. Also *L'Obstétrique*, 1908, No. 4, p. 392. Paris, 1908. [This infant, which lived for a day, had several abnormalities. In appearance it resembled a basset-hound. Total length 43 cm. The thorax and abdomen were nearly normal, but there was pronounced micromelia of the limbs, and the long bones were fractured.]
583. GILLES ET DARGEIN : Foetus abortif achondroplasique. Société d'Obstétrique de Toulouse. *Comptes Rendus de la Société d'Obstétrique, de Gynécologie et de Pédiatrie de Paris*, T. x. pp. 252—255. Paris, 1908. [The mother showed signs of Basedow's disease and had an enormous uterine

- tumour, very probably a dermoid cyst. It was a 5 months' foetus, length 30.5 cm., and exhibited the typical characteristics of achondroplasia. Family history negative. A long description is given.]
584. GUINON, L. LOBLIGEIS, ET APERT, E.: Présentation de radiographies d'achondroplasiques. *Bulletins de la Société de Pédiatrie de Paris*, 1908, pp. 199—204. Paris, 1908. [Description of the radiographs of the achondroplastic girl described in Bibl. No. 495.]
585. MÉRY ET PARTURIER: Un cas de rachitisme congénital. *Bulletins de la Société de Pédiatrie*, 1908, pp. 233—240. Paris, 1908. [A long description is given of a male infant aged about 6 weeks, with thick, short, incurved limbs. Length of right arm 19 cm., of left 16 cm. Length of right leg 14.5 cm., of left 12.5. The father was aged 36, the mother 31, both healthy; they had an elder child aged 7½ years who was healthy. The authors say it is a case of congenital rachitis, not achondroplasia.]
586. MARFAN, A. B.: Sur le rachitisme congénital. *Bulletins de la Société de Pédiatrie*, 1908, pp. 241—247. Paris, 1908. [The author states there are two kinds of congenital rachitis, one type which he calls pure and one type associated with achondroplasia.]
587. SCHRUMPF, P.: Ueber das klinische Bild der Achondroplasia [Chondrodystrophie] beim Erwachsenen und eine, ihr sehr ähnliche bisher noch nicht beschriebene Form von mikromelen Zwergwuchs bei einer 56-jährigen Frau. *Berliner klinische Wochenschrift*, 1908, Jahrgang XLV. S. 2137—2142. Berlin und Leipzig, 1908. [Discussion of the characteristics of achondroplasia, with account of a woman aged 56, height 119 cm. She had normal head and trunk and short limbs. Her brothers and sisters were normal. She appeared normal at birth and developed normally till the age of 7 when she had a feverish affection. Her arms and legs became paralysed and she had to remain lying till the age of 15, when she began to walk and use her hands again. Her trunk and head continued to develop during this period but her limbs ceased to grow.]
588. LEVI, ETTORE: Contribution à l'étude de l'infantilisme du type Lorrain. *Nouvelle Iconographie de la Salpêtrière*, T. XXI. pp. 297—324 and pp. 421—471. Plates. Paris, 1908. [There is a long and useful bibliography of infantilism. Pedigree No. 829.]
589. *PLUMMER, W. E.: Achondroplasia. *China Medical Journal*, Vol. XXII. p. 360. Plate. Shanghai, 1908.
590. *HOCHSINGER, K.: Diagnostische Betrachtungen über einen Fall von Chondrodystrophia foetalis in Saulingsalter. *Zentralblatt für Kinderheilkunde*, Bd. XIV. S. 43—48. Leipzig, 1908.
591. *PAUGAY ET GALLINGER: Foetus achondroplasique. *Écho Méd. du Nord*, T. XII. p. 34. Lille, 1908.
592. *SPEIDEL, E.: Report of an obstetrical Case. Achondroplasia. *Kentucky Medical Journal*, Vol. VII. p. 500. Bowling Green, U.S.A., 1908—9.
593. *BRUDZINSKI: Myxoedème infantile, Mongolisme et Achondroplasia. *Archives de Médecine des Enfants*, 1908, No. 8. Paris, 1908.
594. LABBÉ, MARCEL, ROSENTHAL, G., ET MARCORELLES: Rétrécissement mitral pur et le nanisme. *Bulletins et Mémoires de la Société médicale des Hôpitaux de Paris*, T. 25, 3^e Série, pp. 636—640. Paris, 1908. Also *La Presse médicale*, 1908, pp. 307 and 497—499. Paris, 1908. [A man, Leon H., aged 27, height 1.51 metres. He had mitral contraction (rétrécissement mitral) and showed signs of hereditary syphilis and arrested pulmonary tuberculosis. Some details of his family are given, but he seems too tall to be considered a dwarf.]
595. RAYMOND, FELIX, ET CLAUDE, J.: Sur une forme de dyschondroplasia avec arthropathies et micromélie (Pseudo-achondroplasia rhumatismale). *Comptes Rendus de la Société de Biologie*, T. 64, pp. 263—265. Paris, 1908. Also *La Presse médicale*, 1908, p. 118. Paris, 1908. [Case of a girl aged 20 who, according to her parents, was absolutely normal till the age of 7, and then had acute articular rheumatism followed by stiffness of the joints and complete ankylosis of some of them so that the bones ceased to develop in length. She was under observation for 4 years: the face and trunk developed normally. Compare Schruppf's Case, Bibl. No. 587.]
596. *BUSI: Tre casi di nanismo da mixedema. *Archivio di Ortopedia*, 1908, Fasc. 2.
597. NEUSSER: Zur Klinik der chronischen Polyserositis. Morbus Bamberger (Rheumatismus und Infantilismus). *Wiener klinische Wochenschrift*, No. 14, S. 489, 1908. Wien, 1908.
598. BULLARD, WM., AND GEORGE, ARIAL W.: Achondroplasia. *Boston Medical and Surgical Journal*, 1908, Vol. CLVIII. pp. 969—971. Boston, 1908. [The chief characteristics of achondroplasia are given, and one case, a boy, first seen in July, 1894, then aged 10 months, is described. The parents were healthy, the father aged 54, the mother aged 30. She had had five pregnancies. (1) Boy aged 8, well. (2) Girl aged 7, well. (3) Miscarriage at the 4th month. (4) Boy

- aged $4\frac{1}{2}$, well. (5) Patient. Picture and description of the boy when aged 14 are given, and show the typical achondroplastic type. He had slight rosary, rachitic curvature of spine and double coxa vera. No measurements are given. He was undergoing thyroid treatment.]
599. *CERLETTI: Nuove ricerche circa gli effetti delle iniezione del succo d'ipofisi e di altri succhi organici nell' accrescimento somatico. *Reale Accademia dei Lincei Roma*, 26 aprile e 3 maggio, 1908. Roma, 1908.
600. *POROT: Le Nanisme à la cour des Beys (quelques cas). Reference in *Revue neurologique*, 1908, p. 896. Paris, 1908.
601. *SANDRI: Contributo all' anatomia et alla fisiologia dell' ipofisi. *Rivista di Pat. nerv. e mentale*, 1908, p. 518.
602. *WIESERMANN: Ueber Chondrodystrophie foetalis mit besonderer Berücksichtigung ihrer Entstehung durch mechanischen Ursachen. Inaug. Diss. Marburg, 1908.
603. *KNOOP: Chondrodystrophia foetalis. *Versammlung deutscher Naturforscher und Aerzte*. Köln, 1908.
604. EMERSON, C. P.: Achondroplasia. *Oster and Macrae's Modern Medicine, its Theory and Practice*, 1st edition, Vol. vi. pp. 683—703. London, 1909. [Gives an account of the disease and the literature on the subject.]
605. MOIR, GORDON: Achondroplasia occurring in a Chinaman. *British Medical Journal*, 1909, Vol. II. p. 516. London, 1909. [Pedigree No. 677 and Plate R ((11)—(13)).]
606. DIXON, A. FRANCIS: The skeleton in Achondroplasia. *British Medical Journal*, 1909, Vol. II. pp. 672—673. London, 1909. [On the peculiarities of the achondroplastic skeleton.]
607. CHARLES, J. R.: A Case of Foetal Rickets with comments. *The British Journal of Children's Diseases*, Vol. v. pp. 293—299. London, 1909. [The parents were alive and healthy. The maternal grandmother and one uncle died from cancer. The child was the third of a family of five; another child, aged 9, was said to have been born with rickets, but there was no great amount of evidence in support of this statement.]
608. ECKSTEIN, H.: Ein eigenartiger Fall von Achondroplasie (Chondrodystrophia foetalis). *Berliner klinische Wochenschrift*, 1909, Jahrgang XLVI. S. 1072—1073. Berlin und Leipzig, 1909. [Pedigree No. 686.]
609. HEMPSTEAD, HELEN: Achondroplasia. Report of a case with pathological Report. *The Cleveland Medical Journal*, Vol. 8, No. 11, pp. 675—682. Cleveland, U.S.A., 1909. [A short discussion of the subject with one case, a boy aged 1 year, height 70 cm. Distance from crown to umbilicus 38 cm., from umbilicus to soles 32 cm. Height of father 187 cm., height of mother 154 cm. There were two sisters aged 5, and two who were very healthy (it is doubtful whether this means four sisters or two sisters), and one brother aged 3, whose legs showed extreme rachitic deformities. Full measurements are given.]
610. APERT, E.: Une famille d'achondroplasiques (présentation de malades). *Bulletins de la Société de Pédiatrie de Paris*, No. 2, fév. 1909, pp. 35—37. Paris, 1909. [This gives further particulars of the case described by Launois and Apert in 1905, Bibl. No. 495.]
611. FUSSELL, M. H., McCOMBE, ROBT. S., DE SCHWEINITZ, GEORGE L., PANCOAST, HENRY K.: Achondroplasia. *The Journal of the American Medical Association*, Vol. 53, pp. 1614—1617 and 1617—1619. Chicago, 1909. Also *Pennsylvania Medical Journal*, Athens, Penn., 1909—10, Vol. XIII. pp. 751—756. [pp. 1614—1617, a short paper discussing the main features of achondroplasia with pictures. pp. 1617—1619, characteristic radiographic features of achondroplasia, cretinism and rickets, by Henry K. Pancoast.]
612. BAUER, A.: Infantilisme et Chétivisme. *La Presse médicale*, 1909, 17^e année, pp. 870—872. Paris, 1909. [A discussion on the different kinds of infantilism. He proposes to use the word "Chétivisme" to designate "Infantilisme du type Lorain."]
613. MARIE, A.: Nano-infantilisme et Folie. *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, 5^e Série, T. x. Fasc. 2, pp. 101—113. Paris, 1909. [p. 101 gives a picture of four male dwarfs whom Marie says he observed in Germany. No details are given: see our Plate JJ (72). He divides dwarfism into three classes. (1) Pure dwarfism with relative proportions perfect but reduced. (2) Dwarfism and infantilism with deformities of the skeleton. This class has three sub-divisions. (3) Dwarfism and infantilism caused by dystrophies. This class is divided into two: Total—with five sub-divisions, and Local—with nine sub-divisions specified. He discusses the views of various authors.]
614. *DZIEMBOWSKI: Przegląd de nanki o zboczeniach ivzrostrn chrznstek (Chondrodystrophia foetalis). *Now. lek. Poznani*, XXI. pp. 586—590. 1909.

615. *BENEKE: Chondrodystrophia foetalis. *Sitzungsbericht der Gesellschaft zur Beförderung der gesammten Wissenschaften zu Marburg*, 1908, S. 38—41. Marburg, 1909.
616. *MARKELOFF, G. T.: (A typical case of Achondroplasia). *Russk. Vrach.* viii. pp. 824—826. St Petersburg, 1909.
617. *VOISIN, J., ET VOISIN, R.: Un cas d'achondroplasie. *L'Encéphale*, 1909, T. ii. pp. 221—227. Paris, 1909. Two Plates.
618. SAINTON, PAUL: Les Nains. *La Tribune médicale*, 1909, 42^e année, pp. 293—294. Paris, 1909. [A short article on dwarfs in general. He divides them into the following classes: (1) myxoedematous, (2) achondroplastic, (3) rachitic, (4) "nains pottiques" (see ft. p. 369 *supra*), (5) anangioplasic, (6) pygmies, (7) dwarfs of surrenal origin. He refers to an achondroplastic brother and sister, aged 37 and 32 years respectively, with five normal siblings and normal parents, the family P—— from Bordeaux.]
619. LAUNOIS, P. E.: Essai biologique sur les nains. *Le Bulletin médical*, 23^e année, pp. 957—962. Paris, 1909. [A lecture on dwarfs illustrated by poor reproductions of some very good photographs of a troupe (largely same as London Olympia troupe: see p. 406 *supra*) exhibited in the Jardin d'Acclimatation, Paris, 1909. Among these the Magri family, a mulatto dwarf, and a Russian achondroplastic dwarf shown with a slightly taller dwarf son at Earl's Court Exhibition in August, 1911.]
620. LEVI, ETTORE: Sur un nouveau cas d'achondroplasie chez l'adulte. *Nouvelle Iconographie de la Salpêtrière*, T. xxii. pp. 133—152. Paris, 1909. Plates. [Account of Luigi Lusti, aged 25, height 115 cm. Father normal, died aged 45 of an acute infectious disorder. Mother normal, alive and healthy and intelligent. Two sisters and a brother alive and healthy, three sisters died of acute disease, all normal.]
621. REGNAULT, FELIX: Plusieurs cas de dysplasie périostale montrant les divers degrés d'intensité de cette maladie. *Bulletins et Mémoires de la Société anatomique de Paris*, 6^e Série, T. xi. pp. 429—432. Paris, 1909. [A description of some specimens in the Musée Dupuytren, two of which were achondroplastic. Regnault shows how periosteal dysplasia and achondroplasia have been confounded.] *Ibid.* pp. 433—434, Micromélie segmentaire et symétrique. [Description of a skeleton in the Musée de Toulon which showed limited achondroplasia or micromelia limited to the two humeri.] See also *La Presse médicale*, 1909, pp. 503—504. Paris, 1909.
622. DUSTIN: Sur le nanisme, présentation de nains myxoedémateux, rachitique et achondroplasique. Société Clinique des Hôpitaux de Bruxelles, 12 Juin, 1909. *La Presse médicale Belge*, 61^e Année, 1909, pp. 628—629. Bruxelles, 1909. [This appears to be a paper or a series of papers on the different kinds of dwarfism of which only the first instalment is given in the above reference.] See also **Polyclinique*, T. 18, pp. 198—200. Bruxelles, 1909. **Journal médical de Bruxelles*, T. 14, p. 375. Bruxelles, 1909. **Clinique*, T. 23, pp. 452—454. Bruxelles, 1909.
623. *GIUFFRIDA, RUGGERI: I caratteri pseudo-infantile. *Archivio per l'Antropologia e l'Etnografia*, 1909, Nos. 1—2.
624. *BIRNBAUM: Klinik der Missbildungen und kongenitalen Erkrankungen des Fetus. Berlin, 1909.
625. WEINZIERL, HANS: Ein Beitrag zur Casuistik der Chondrodystrophia foetalis, mit 7 Abbildungen. *Archiv für Kinderheilkunde*, Bd. 51, S. 138—150. Stuttgart, 1909. [A few remarks on Chondrodystrophia foetalis with description of a case. A boy aged 17 months, parents healthy, height 65.5 cm. He had short arms and legs, and genu valgum. The upper extremities were longer than the lower. There is a long description and measurements. No family history.]
626. Article: Tiny Town. *British Medical Journal*, Vol. ii. p. 1768. London, 1909. [On the dwarfs exhibited at Olympia, London. Says there were some striking examples of achondroplasia; two of exceptional interest inasmuch as they were instances of achondroplasia in parent and offspring. According to the mother in this case there were two other deformed children, who died in infancy. The reference is probably to the Kipke family: see Pedigree No. 608.]
627. BLOCH, ADOLPHE: Présentation de radiographies des mains d'un nain et d'un achondroplase. *Bulletin de la Société de l'Internat des Hôpitaux de Paris*, 6^e année, pp. 324—328. Paris, 1909. [In addition to the radiographs of the hands, photographs are given of the ateliotic dwarf aged about 21, height 98 cm. in his shoes, and of the achondroplastic dwarf aged 28, height 127.8 cm.]
628. MOLODENKOFF, S. S.: Un cas d'achondroplasie chez un Chinois. *Nouvelle Iconographie de la Salpêtrière*, T. xxiii. pp. 43—46. Paris, 1910. [Account of an achondroplastic Chinaman. No family history.]
629. JAMES, C. H.: Three varieties of dwarfs. Plates. Reprint from *The Indian Medical Gazette*, Vol. xlv. No. 11, Nov. 1910. [Pedigrees Nos. 796 and 797 and our Plates LL and MM.]

630. BATTY-SHAW, H.: Two Cases of Symptomatic Infantilism. *Clinical Section. Proc. Royal Society of Medicine*, Nov. 11, 1910, also *The Lancet*, Vol. II. 1910, p. 1487. London, 1910. [Two cases of the symptomatic infantilism described by Hastings Gilford were shown. (1) A female, aged 18, height 4 ft. 4½ inches, weight 4 stones 4½ pounds, belonging to a family of normal height and weight. The delay in growth was first noticed in the third year of life. (2) A female, aged 27, height 4 ft. 6 inches, who also belonged to a family of average height and weight. She was a 6 months' child, and at the age of 1 year was smaller than her new-born sister. A case of asexual ateleiosis (sub-group of essential or cryptogenetic infantilism of Hastings Gilford, Bibl. No. 403, p. 316). The patient was a male, aged 36, height 3 ft. 8¾ inches, weight 4 stones 11 lbs. 1 oz.]
631. PRITCHARD, ERIC: A Case of Achondroplasia. *Section for the Study of Disease in Children. Proc. Royal Society of Medicine*, Vol. IV. No. 1, pp. 1—3. London, 1911. Plate. Also *British Medical Journal*, 1910, Vol. II. p. 1442, and *The Lancet*, 1910, Vol. II. p. 1344. London, 1910. [A girl aged 5, height 30 in. Length of arm 10 in., length of leg 12½ in. The skiagrams showed defective ossification of the epiphyses of the long bones, with overgrowth of the cartilages. The patellae were either absent or rudimentary. Parents and five other normal children were healthy. A full description is given in first reference.]
632. JUBB, A. A.: A Case of Dwarfism. *British Medical Journal*, Dec. 31, 1910, p. 2026. [H. W., a boy of 9, height 36½", with photographs; said not to be a case of achondroplasia but of infantilism and rickets. Father, mother, and four siblings said to be normal.]
633. Article: Dwarfs. *Encyclopædia Britannica*, 11th Edition, Vol. VIII. pp. 739—740. Cambridge, 1910. [A short article giving an account of some well-known dwarfs, such as John Jarvis, Jeffrey Hudson, etc. The information is apparently taken chiefly from Wood, see Bibl. No. 138.]
634. FORSELL, O. H.: Ett fall af Chondrodystrophia foetalis. *Hyggia*, 2 F. Bd. x. pp. 550—553. Stockholm, 1910. [A foetus asphyxiated at birth, length 40 cm., weight 3200 grammes. It is said to have exactly resembled the case described by Salvetti, Bibl. No. 298. The extremities were curved. A description was given, but no measurements. The mother, aged about 30, had had two normal children, one 12 years, the other 4 years, previously. The father was said to be alcoholic; nothing could be ascertained with regard to syphilis.]
635. JEANNIN, C., ET SURUN: Foetus achondroplasique. *Bulletins de la Société d'Obstétrique de Paris*, T. XIII. pp. 181—184. Paris, 1910. [A male infant, length 36 cm., weight 2120 grammes, died one hour after birth. The thorax was normal, the limbs short and thick with enlarged epiphyses. The mother had had a previous child in 1907, who died, aged 7 months, of broncho-pneumonia.]
636. CAFFERATA, JUAN F.: Un cas d'achondroplasie. *Archives de Médecine des Enfants*, T. XIII. pp. 275—276. Paris, 1910. [A girl aged 2 years and 7 months. The family history was unimportant. The parents were healthy, the father aged 40 and the mother aged 30. There were two elder children, boys, both healthy. Her height was hardly 71 cm. She had a large head and short limbs, the upper and fore-arm being of same length. Radiographs are given.]
637. VARIOT, G., ET PIRONNEAU: Nanisme avec dystrophie osseuse et cutanée spéciales (*sic!*). Soupçon d'agénésie des capsules surrénales. *Bulletins de la Société de Pédiatrie de Paris*, 1910, pp. 307—314. Paris, 1910. Also *Ibid.* 15 Nov. 1910 and *La Presse médicale*, 1910, pp. 494 and 894. Paris, 1910. [A girl aged 15, height 102 cm. and weight 11·650 kilos. Trunk and limbs were proportionately reduced. She had only a few scattered hairs on her head, and her expression was extraordinarily aged. A long description is given. She was an eight months' child, breast-fed, was weaned at 15 months and ceased to grow regularly from this time. The father and mother were healthy and had two normal sons, a third had died of meningitis. The second paper gives three observations sent to them by Gilford.]
638. APERT, E.: Achondroplasie. *Bulletins de la Société de Pédiatrie*, 1910, pp. 213—215. Paris, 1910. [Description of a boy aged 16½ years, height 122 cm. The mother was of abnormal height and weight. The father and three other children, two boys and a girl, were normal.]
639. ZOZIN, P.: Un cas d'achondroplasie. *Nouvelle Iconographie de la Salpêtrière*, T. XXIII. pp. 31—42. Paris, 1910. [A general discussion on achondroplasia with a new case; a boy aged 21, height 118 cm., weight 36 kilos. His parents were healthy and he had four brothers. There is a long description with measurements.]
640. LEVI, ETTORE: Contribution à la connaissance de la microsomie essentielle, hérédo-familiale. Distinction de cette forme clinique d'avec les nanismes, les infantilismes et les formes mixtes de ces différentes dystrophies. *Nouvelle Iconographie de la Salpêtrière*, T. XXIII. pp. 522—561 and 600—684. Paris, 1910. Plates. [A discussion on the different forms of dwarfism. Pedigrees Nos. 695, 742.]

641. LEVI, ETTORE: Encore sur la question des infantilismes à propos d'une note de M. A. Bauer sur ce sujet. *Nouvelle Iconographie de la Salpêtrière*, T. xxiii. pp. 20—24. Paris, 1910. [Title describes subject: see Bibl. No. 612.]
642. BAUER, A.: Sur le Chétivisme [Réponse à M. Ettore Levi]. *Nouvelle Iconographie de la Salpêtrière*, T. xxiii. pp. 25—30. Paris, 1910. [Title explains subject: see Bibl. No. 641.]
643. *APERT, E.: Achondroplasia. *Annales de Médecine et Chirurgie infantiles*, T. xiv. pp. 391—393. Paris, 1910.
644. FRANCHINI, GIUSEPPE, ET ZAMASI, MAURO: L'achondroplasia, est-elle héréditaire? Quatre cas d'achondroplasia chez des adultes. Étude clinique et radiographique. *Nouvelle Iconographie de la Salpêtrière*, T. xxiii. pp. 244—275. Paris, 1910. Plates. [A discussion on the heredity of achondroplasia, with four interesting cases. (1) Andrea Bernabé, a man aged 59, height 120 cm. His parents and two sisters were normal. No other details with regard to the family could be ascertained. A long description and measurements are given. (2) Auguste C.: see Pedigree No. 682. (3) Otto B., aged 23, height 113 cm. His parents, two sisters and three brothers were normal. Nothing remarkable in ancestors or collaterals. Full description and measurements given. (4) Anna G.: see also Pedigree No. 682.]
645. MILNE, ROBT.: Two Cases of Achondroplasia. *Clinical Section. Proc. Royal Society of Medicine*, Vol. iii. Pt. i. p. 55. London, 1910. [Woman aged 22, height 45 inches, and boy aged 15, height 45 inches, not related, both typical cases of achondroplasia.]
646. WEBER, F. PARKES: Ateleiosis in a man aged 42. Physical development said to have been arrested at about the age of 9 years. *Section for the Study of Disease in Children. Proc. Royal Society of Medicine*, Vol. iii. Pt. i. pp. 143—146. London, 1910. [A man aged 42, unmarried, height 47 7/8 inches, weight 4 stone 13 lbs. His head was rather large for his body. Description and skiagrams are given. No history of dwarfism in the family.]
647. HUTCHINSON, R.: Achondroplasia in a twin. *Section for the Study of Disease in Children. Proc. Royal Society of Medicine*, Vol. iii. Pt. i. p. 41. London, 1910. [A girl aged 1½ years, a case of well-marked achondroplasia. The twin was healthy. The mother had had two miscarriages. See our Plate P ((2)—(5)).]
648. GILFORD, HASTINGS: Case of asexual Ateleiosis. *Clinical Section. Proc. Royal Society of Medicine*, Vol. iv. No. 2, pp. 34—35. London, 1910. [T. L. S., a man aged 28, height 113.5 cm., weight 30.38 kilos. This is the same case as is described in Bibl. No. 403, p. 305.]
649. CHEVALIER-LAURE ET VOIVENEL: Nanisme mitral, sclérodémie et glandes à sécrétion interne. Congrès des Médecins Aliénistes et Neurologistes. *La Presse médicale*, 1910, p. 621. Paris, 1910. [After examining the various etiologies of mitral dwarfism, the authors considered the action of the glands concerned with internal secretions, which histological dissection showed were injured in a male dwarf aged 44, height 123 cm., weight 23 kilos. This dwarf had Maurice Raynaud's paralysis, followed by scleroderma, which showed that these two pathological processes resulted from the same cause.]
650. PERRIN, MAURICE, ET RICHON, LOUIS: Le Nanisme toxique. *La Presse médicale*, 1910, pp. 339—340. Paris, 1910. [A paper on the effect of poisons, especially tobacco, on the growth of animals, with accounts of experiments on rabbits inoculated with infusions of tobacco. References are given to other papers on the same subject.]
651. BLOCH, ADOLPHE: Renseignements fournis par la radiographie dans le nanisme et l'achondroplasia. *La Presse médicale*, 1910, 18^e année, p. 45. Paris, 1910. [Shows how the uniting cartilages differ in true dwarfism and achondroplasia.]
652. KEPPEL ET CHARROL, E.: Le nanisme mitral myxoedémateux. *Revue de Médecine*, T. xxx. pp. 153—161. Paris, 1910. [Account of a girl aged 16 who looked 12, height 145 cm. She was of the classic infantile type, with superior intelligence. Her father had died, aged 45, of an affection of the liver. There was said to be an hereditary alcoholic trait in the family. Her mother, aged 50, was healthy and she had three vigorous, well-built brothers, aged 27, 22 and 19. She died, and the autopsy showed that there existed "rétrécissement mitral et une hypoplasie du système artériel."]
653. *MINET, J., ET VENDEAU, M.: Cryptorchidie bilatérale, absence du verge, infantilisme chez un homme de 67 ans. *Écho Méd. du Nord*, T. 14, p. 51. Lille, 1910.
654. *CHAMER: Zwei Fälle von Micromelie. *Archiv f. Orthop. etc.* Bd. viii. S. 258—269. Wiesbaden, 1910.
655. *SHABAD, T. O.: Dwarf child (from trauma of the head). *Med. Obozr.* LXXIII. pp. 960—968. Moscow, 1910.

656. *SANTÉ DE SANTOS: Infantilismo e mentalia infantile. *Rivista Italiana di Neuropat. Psich. ed Elettroterapia*, 1910, p. 58.
657. *VIOLE: L'abito tísico et l'abito apopletico nei rapporti con l'infantilismo, la precocità, il gigantismo et la acromegalia. *La Clinica Medica Italiana*, aprile, 1910.
658. SUMITA, MASAO: Beiträge zur Lehre von der Chondrodystrophia foetalis (Kaufmann) und Osteogenesis imperfecta [Vrolik] mit besonderer Berücksichtigung der anatomischen und klinischen Differentialdiagnose, mit 9 Abbildungen. *Deutsche Zeitschrift für Chirurgie*, Bd. 107, S. 1--110. Leipzig, 1910. [A long paper with description of one case of Chondrodystrophia foetalis malacica, three of Chondrodystrophia foetalis hypoplastica and three of Osteogenesis imperfecta with elaborate tables of measurements. There is a discussion of the subjects mentioned in the title with a bibliography of 254 references to articles on myxoedema, cretinism, chondrodystrophia foetalis, achondroplasia, etc.]
659. *MOUCHET et SEQUINOT: Soc. de Pédiatrie, 18 Jan. 1910, reported in *Archives de Médecine des Enfants*, T. XIII. p. 238. Paris, 1910. [They showed a girl aged 14. suffering from an abnormal form of achondroplasia, with multiple congenital malformations. Hexadactyly of both hands and absence of all the incisors.]
660. SYMES-THOMPSON, H. E.: Case of Infantilism. *Clinical Section. Proc. Royal Society of Medicine*, Vol. iv. No. 3, pp. 45--46. London, 1911. [A woman aged 34, single, height 3 ft. 2½ in., weight 3 stone. She ceased to grow at 3 or 4 years of age. There was nothing of note in the family history. The thyroid body could not be felt. Skiagrams showed a backward state of ossification. The author says this case, according to Hastings Gilford's classification, was one of primary infantilism or ateleiosis.]
661. KELLIE, KENNETH: Two cases of Infantilism. *Section for the Study of Disease in Children. Proc. Royal Society of Medicine*, Vol. iv. No. 4, p. 59 London, 1911. [Case (1). A girl aged 4, weight 17 lbs. 2 oz., height 29½ inches. The parents and two other children were healthy, one child died of wasting (?), one child was born dead. Case (2). A boy aged 3½, a twin; the other died. Weight 16 lbs., height 28 inches. Two elder children and one younger were healthy.]
662. APERT, E: *Médications générales de la croissance*, pp. 418--419. Paris, 1911. [On the various kinds of retardation in growth and the best method of treating them. pp. 418--419 treat of "Nanisme dit essentiel," "Nanisme achondroplasique" and "Nanisme micromélique."]
663. FLETCHER, H. MORLEY: Case of Infantilism with Polyuria and Chronic Renal Disease, and a case of Infantilism with Thyroid Inadequacy. *Section for the Study of Disease in Children. Proc. Royal Society of Medicine*, Vol. iv. No. 6, pp. 95--96. London, 1911. [(1) Boy aged 6, said not to have grown since the end of his first year. Height 2 ft. 7 inches, weight 21 lbs. He was the eldest child and had a healthy sister aged 4. The mother was phthisical and had had one miscarriage. Administration of thyroid had no effect. This case was considered one of infantilism associated with or due to chronic renal disease dating from intra-uterine existence. (2) Girl aged 8. Height 33 inches, weight 24½ lbs. She was the seventh of nine children, all alive except the third. Thyroid treatment did not affect growth.]
664. GILFORD, HASTINGS: *The Disorders of Post-Natal Growth and Development*. London, 1911. [Deals with infantilism, ateleiosis, and to a less extent with achondroplasia, myxoedema, and cretinism, largely from an individual standpoint.]

ADDENDUM.

282. MÜLLER, SIGFRID. [His paper of 1893 gives an exhaustive account of Anna Harlander born 17 Jan. 1892, daughter of a tram-driver; she died aged 5 weeks. She was a twin and the seventh child of apparently healthy parents. No syphilis in parents. Birth 5 weeks before term. She was born with curved (krummen) limbs. Length 33.5 cm. The first child died aged 1 year from convulsions due to teething ("an Zahnfreisen"). The second was a miscarriage at 4 months, the third a premature birth at 6 months, it died 1 hour after birth. The fourth, aged 4, was scrofulous. The fifth, aged 3, and the sixth, aged 1½, were healthy. The second twin was perfectly healthy and well developed.]

ALPHABETICAL LIST OF WRITERS REFERRED TO IN BIBLIOGRAPHY.

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*The Index to names of historic dwarfs and published names of dwarf
 families follows the family histories.*

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
1	Aretino, Spinello.	1333—1410 (circa)	St Benedict discovers the guile of Totila.	Fresco. Sacristy of San Miniato, Florence.	Two attendants on left of picture of short stature said to be dwarfs. No special characters which would identify type.
2	" "	" "	St Benedict leaves the paternal home.	Fresco. Sacristy of San Miniato, Florence.	Attendant said to be dwarf on left of picture, but no characteristic features.
3	Fra Angelico, or Angelico da Fiesole.	?—1455	The abbot St Romuald reproaching the Emperor Otho III with the murder of Crescentius, a Roman Senator.	Museum. Antwerp.	A dwarf almost certainly achondroplastic holds the Emperor's sword.
4	Lippi, Filippino.	1458—1504	Adoration of the Magi (ascribed to Lippi, but has been said to be a masterpiece of Botticelli freely retouched).	National Gallery, London.	A bearded dwarf, almost certainly achondroplastic, to left of picture.
5	Fogolino, Marcello.	1470—1550	Adoration of the Magi.	Museo Civico, Vienza.	A dwarf with adult face and thick legs, probably achondroplastic, to right centre of picture.
6	Mantegna, Andrea.	1431—1506	The Triumph of Julius Caesar.	Original cartoons at Hampton Court. Copies in Vienna.	Dwarf to right of picture. By shortness of lower limbs achondroplasia is suggested, and the muscularity and some features of head support this view. The shapes of arms and hands do not confirm it; there is marked macrocheilia more suggestive of myxoedema, and the ears are of a form which does not occur in the scale above the lower apes. The figure is probably a composite one.
7	" "	" "	The Family of Ludovico II, with a female dwarf in the service of Barbara von Brandeburg, wife of Ludovico.	Painted on the walls of the "Camera dei sposi" in the old Palazzo, Mantua.	To the right centre a female dwarf, probably a case of infantile myxoedema.
8	Ghirlandaio, Domenico.	1449—1498	The Feast of Herod.	Fresco on the right wall of the Choir Chapel in Santa Maria Novella, Florence.	A dwarf with his back to spectator to left centre of top compartment of picture, type uncertain, probably not achondroplastic.
9	Carpaccio, Vittorio.	1450—1522 (circa)	The ambassadors to the King of the Moors.	Accademia di Belle Arti, Venice.	A dwarf with bowed legs to left centre on quay at back of picture.
10	Carpaccio, Vittorio.	1450—1522 (circa)	Two Courtesans on a Balcony.	Museo Civico, Venice.	Dwarf to left back of picture under balustrade, infantile myxoedema (?).
11	Ansuino da Forli.	Middle of 15th century	St Christopher before the King.	Chiesa degli Eremitari, Padua.	Achondroplastic (?) dwarf to left, outside entrance to audience chamber.
12	Bosch, Hieronymus (properly Van Aken)	1460—1516 (circa)	Das Steinschneiden.	Rijksmuseum, Amsterdam.	Small dwarfish figure with big head and slender limbs in operating chair. Dwarf-like figure or gnome to left bottom on frame of picture.

¹ This Iconography makes no claim to completeness, especially in the sections of prints, book illustrations, and in recent times, newspaper illustrations; many of the latter will be found referred to in the text or bibliography. Those marked with * have not been seen in original, in photograph or other reproduction by the iconographer.

SECTION I. continued

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
13*	Cossa, Francesco.	Worked 1460—1486	?	?	Richer, <i>L'Art et la Médecine</i> , Paris, 1901, p. 208 mentions dwarf in a picture of Cossa's and describes him as a little man with features covered with fat and sausage-shaped limbs. He might pass for a myxoedematous type. His short tunic shows the genital organs atrophied. (Not reproduced.)
14	Cranach, Lukas.	1472—1533	The Sleeping Giant (or Hercules) and the Pygmies.	Königliche Galerie, Dresden.	Incident referred to in ftn. on p. 355. Hercules is attacked by gnomes or dwarfs of folklore type—as far as they are true to nature they are achondroplastic in type.
15	"	"	The Awakened Giant (or Hercules) and the Pygmies.	"	To right of picture a bow-legged (?) dwarf, with hair on face, offers a goblet to female musicians.
16	Giorgione or Barbarelli, Giorgio.	1478?—1511	Moses saved from the Waters.	Galleria Pitti, Florence.	To extreme right (and (?) to extreme left also) a dwarf figure.
17	Badila, Antonio.	1480?—1560	The presentation of Jesus to Simon.	R. Pinacoteca, Turin.	To right of central panel an achondroplastic dwarf.
18	Ferrari, Gaudenzio.	1484—1549	Adoration of the Magi.	R. Pinacoteca, Palazzo Brera, Milan.	Left side only of a dwarf figure to right of picture. Adult bearded face but hardly achondroplastic limbs.
19	"	"	"	Chiesa di San Giuliano, Vercelli.	In the centre is a dwarf dressed as a buffoon with violin on his shoulder. He has thick short legs, crooked nose and oldish head. (Richer, <i>L'Art et la Médecine</i> , Paris, 1901, p. 207.)
20	Florentine School.	15th century	Episode in the life of the young Tobias.	Museum, Berlin.	! Achondroplastic dwarf figure to right, the figure might be rickety.
21	Romain, Jules (pupil of Raffaele).	1492—1546	Apparition of the Cross.	Fresco, Vatican, Rome.	An achondroplastic dwarf of remarkably small size on a rather damaged part of fresco. (Cf. E. Levi, Un document medico-artistique sur l'achondroplasie. <i>Nouvelle Iconographie de Salpêtrière</i> , T. xxii. p. 228, Paris, 1909.
22	Gozzoli, Benozzo.	1420—1478	Tower of Babel.	Fragment of a fresco in the Campo Santo di Pisa.	Achondroplastic dwarf by left-hand column. Dwarf (?) achondroplastic) to left-hand with dog.
23	Bonifacio.	1491—1553	Moses saved from the Nile.	R. Pinacoteca, Palazzo Brera, Milan.	Dwarf (3 myxoedematous) with dog.
24	Moretta da Brescia.	1498—1555 (circa)	Christ in the House of the Pharisee.	Chiesa della Pietà, Venice.	An adult achondroplastic dwarf with a parrot on his left shoulder stands behind the negro boy to left hand of table.
25	Bassano, J.	1510—1592	The Preaching of the Baptist.	S. Giacomina dell'Orto, Venice.	
26	Mor, Antonio (van Dasselhorst).	1512—1578?	The dwarf Corneille, favourite of Charles V.	Musée du Louvre, Paris.	
27	Veronese, Paolo.	1528—1588	Marriage of Cana.	"	

28	Veronese, Paolo.	1528—1588	Esther before Abasuerus.	Musée du Louvre, Paris.	Achondroplastic dwarf to centre of picture.
29	" "	" "	Moses saved from the Waters.	El Prado, Madrid, and another copy in Hermitage, St Petersburg.	A bow-legged (? rickety) dwarf to right of picture.
30	" "	" "	Discovery of Moses.	Königliche Galerie, Dresden.	
31*	" "	" "	Moses saved from the Waters.	A picture of this name by Veronese was in the cabinet of Louis XV in 1742, according to Richer, <i>L'Art et la Médecine</i> , Paris, 1901. (Is this the one now in the Hermitage, St Petersburg?)	? Same dwarf as in 28 to left of picture. Not seen.
32	" "	" "	Adoration of the Magi.	R. Pinacoteca, Palazzo Brera, Milan.	A dwarf, probably achondroplastic, holding a dog to right of picture.
33	" "	" "	The family of Darius before Alexander.	National Gallery, London.	Bow-legged (? rickety) dwarf to extreme left of picture.
34	" "	" "	Jesus in the House of Levi.	R. Accademia, Venice.	Dwarf to left centre, type not determinable
35*	Strada, Giovanni, or Jan van der Straet.	1536?—1605	Dwarfs in several pictures	Engraved by Galle (see Nos 136—7 and p. 470).	We have seen several references to these dwarfs, but the original pictures have not been located
36	Liano, Felipe de.	1556—1625	Infanta Isabella with dwarf.	El Prado, Madrid.	Female dwarf of indeterminate type.
37	Van der Venne, Adriaen.	1589—1662	De Zielenvisscherij (1614).	Amsterdam.	Achondroplastic dwarf to right.
38*	Caracci, Annibale.	1560—1609	Satirical composition.	National Museum, Naples.	At the left of the picture is a dwarf with bowed legs leaning on a dog; he has a parrot on his wrist. Described but not reproduced in Richer's <i>L'Art et la Médecine</i> , Paris, 1901
39	Argenti, Jacopo.	2nd half of 16th century	Charles Emmanuel as a youth with his hand on the head of a dwarf.	Galleria Reale, Turin.	Achondroplastic dwarf.
40	Dutch School.	16th century	Ein Leiermann	Gemäldegalerie, Vienna.	Infantile myxoedema.
41	Rubens, Peter Paul.	1577—1640	Count Thomas Arundel with his wife, dwarf and falcon, fool and dog.	Alte Pinakothek, Munich. See No. 182 nd below.	Dwarf to right. Type not sufficiently defined, but appears to be ateleiotic.
42	Domenichino.	1581—1641	Meeting of St Nilo with the Emperor Otho at Gaeta.	Grotta Ferrata, Greek Monastery of Basilians.	Head and left shoulder of a probably achondroplastic dwarf with shield and sword of Emperor to left centre of picture.
43*	Mytens, Daniel.	1590—1658?	Jeffrey Hudson, with Charles I and Henrietta Maria, horses, etc. He is holding dogs in a leash, c. 1627.	Buckingham Palace, London.	Ateleiotic dwarf. Once the Earl of Dunmore's; purchased for Queen Victoria at Christie's.
43 ^b	" "	" "	" "	Lord Derby at Knowsley.	? Original of 43 ^a and 43 ^c . Background less detail, said to have been presented by Charles I. to 7th Lord Derby.
43 ^c	" "	1590—1660	Jeffrey Hudson, with Charles I and Henrietta Maria, horses, etc., Hudson is holding dogs in left-hand corner of picture.	In the possession of Viscount Galway, Drawing Room, Serby Hall, Bawtry, Yorks.	The picture "belonged to Queen Anne, was given by her to Addison, then passed to Lady Warwick, his wife, at Holland House and so to Serby" (Letter of Lord Galway, August 7, 1911).
44*	" "	" "	Jeffrey Hudson, in a red dress (? 1630).	Hampton Court.	Probably the best illustration of J. H.'s ateleiosis.
44 ^b	" "	" "	Jeffrey Hudson, with a dog, under trees.	This is said in works of the 18th century to be in St James' Palace, London.	It is, perhaps, the picture now at Hampton Court as there is no such picture at St James' Palace (Letter from the Comptroller, August 8, 1911).

SECTION I. continued

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
45	Mytens, Daniel.	1590—1660	Jeffrey Hudson with a dog, 1637.	National Portrait Gallery, London.	Once in possession of Sir Ralph Woodford, the picture reproduced by G. P. Harding and engraved by Snow for the <i>Biographical Mirror</i> : see No. 150, and our Plate HH (66).
46*	"	"	Queen Henrietta Maria and Jeffrey Hudson	In the collection of Earl Fitzwilliam.	No reproduction known. A picture, said to be in the collection of "Lord Milton" by writers of last century, no doubt refers to Earl Fitzwilliam's picture. See <i>Corrigendum</i> , p. 470.
47	Callot, Jacques.	1592—1635	Le Pont Neuf de Paris.	Accademia di Belle Arti, Venice.	Achondroplastic dwarf to left centre of picture.
48	"	"	La Foire de l'Imprunette.	Accademia di Belle Arti, Venice.	Several dwarf-like figures, but dimensions of photograph we have been able to examine do not permit us to assert their actual dwarfism, much less suggest its type.
49	Vandyck, Sir Anthony.	1599—1641	Queen Henrietta Maria and Jeffrey Hudson, c. 1632.	Northbrook Collection.	Jeffrey Hudson is represented with a monkey on his shoulder looking up at the Queen, who has her hand on the monkey. At Petworth is a copy of this by Chas. Jervass (1675—1739).
50	"	"	Mary, Duchess of Richmond, and Mistress Gibson.	Pembroke Collection.	Mrs Gibson is handing a pair of gloves to the Duchess. She looks like a child and her long dress completely conceals her figure. She appears ateleiotic.
51*	"	"	Portrait of Richard Gibson.	Said to have been once in the possession of Sir W. Hamilton.	Ateleiotic dwarf. Further Gibson portraits are referred to in <i>Dict. Nat. Biog.</i> , but are not traceable.
52	Velasquez.	1599—1660	Un nano (El Primo).	El Prado, Madrid.	An achondroplastic dwarf: see Plate VV.
53	"	"	Un nano (Sebastiano de Morra).	"	"
54	"	"	Un nano (Antonio l'Inglese).	"	"
55	"	"	Il Bimbo de Vallecas.	"	"
56	"	"	Las Meninas.	"	"
57	"	"	Il Bobo de Coria.	El Prado, Madrid.	? Myxoedematous dwarf. To right of picture an achondroplastic female dwarf, Maria Barbola, and an ateleiotic male dwarf, Nicolasio Pertuseno: see Plate VV.
58*	"	"	The dwarf Barbola.	Musée d'Auch.	? Achondroplastic. As far as the face is concerned this dwarf looks like an older stage of No. 54.
59	"	"	Portrait of a Spanish dwarf. This is a poor copy of Antonio l'Inglese. No. 54.	Berlin.	Garnier, <i>Les Nains et les Géants</i> , Paris, 1884, describes this picture as follows: "La naine Barbola y est représentée de face de grandeur naturelle, et tenant un petit chien sur son bras droit. Ses cheveux tombent dans toute leur longueur.... Elle est affreusement aide." (Not reproduced.) Cf No. 55 Achondroplastic.

60	Velasquez.	1599—1660	Dom Balthazar Carlos and his dwarf.	Castle Howard. Seat of the Earl of Carlisle.	? Ateleiotic.
61	Molinaer, Jan Miense.	1610—1668	L'Atelier du Maître (1631).	Berlin.	Typical achondroplastic dwarf dancing with a dog in centre of picture.
62	Van Ostade, A.	1610—1685	A Village Dentist.	Vienna.	An achondroplastic (?) infantile myxoedematous) dwarf holds basin to left of picture.
63	Teniers, David.	1610—1690	The Temptation of St Anthony.	El Prado, Madrid.	Dwarf-like figures, type indefinite.
64	Carreno di Miranda, Juan.	1614—1685	Ragazza gigantesca.	" "	See Bibl. 14* for contemporary description. The type appears to be one not yet classified, but comparable with that of Carrie Akers (see our p. 361) and of Barbino. See Bibl. No. 14* and Icon. No. 118*.
64*	" "	" "	La monstreuse nue.	Royal Palace, Madrid.	A painting in the nude of the female dwarf recorded in 64* mentioned by Widdington in <i>Spain and the Spaniards</i> in 1843, Vol. II. p. 20, 1844, as the portrait of a nude female dwarf represented as Silenus and wrongly attributed by him to Velasquez.
65	" "	" "	La Regina Maria Teresa.	Cook Gallery, Richmond.	Dwarf in background, type uncertain.
66*	Lely, Sir Peter.	1618—1680	The dwarf Artist Rich ^d Gibson and Anne Shepherd his wife, hand-in-hand.	? Originally in the possession of the Earl of Pembroke.	Both probably ateleiotic. Not traceable.
67*	" "	" "	Gibson and his master Francisco Clein as archers.	Originally in possession of Mr Rose, Gibson's son-in-law.	Lely painted other portraits of both dwarfs, also not traceable.
68	Verwilt, Franz	1623—1691	Portrait of an Admiral's son.	Amsterdam.	Gibson was probably ateleiotic. Not traceable.
69	Fyt, Jan.	1625—1671	Dog, boy and dwarf.	Genalgalerie, Dresden.	The nature of the dwarfism is not clear. It might be ateleiosis or a mild form of infantile myxoedema.
70*	Giardano, Luca.	1632—1705	Dwarf.	Fresco, Escorial, Madrid.	Dwarf probably of infantile myxoedematous type.
71	Steen, Jan. †	1626—1679	La Ménagerie.	Hague Museum.	See <i>Cherrot et Richet</i> , p. 44.
72*	" "	" ?	The dwarf Michele Magnan.	Museo Civico, Bologna in 1642.	A dwarf, possibly rickety, to left.
73	Bocchi, Fausto.	1659—1742 (circa)	Fight of Dwarfs with a chicken.	Palazzo Martinengo, Brescia.	Ateleiotic dwarf, see Bibl. No. 8. Large number of "fancy" dwarfs. The artist used largely the achondroplastic type as his models.
74	" "	" "	Village Fête of Dwarf-folk.	" " "	A dwarf of quite uncertain type ascends steps in centre of picture.
75	Tiepolo, Giovanni Battista.	1696—1770	Banquet of Antony and Cleopatra. Tiepolo called it Aeneas and Dido.	Fresco in the Palazzo Labbia, Venice.	A dwarf, possibly of achondroplastic type, to right of picture.
76	" "	" "	The Feast of Cleopatra.	Hermitage, St Petersburg.	A dwarf, type uncertain, to right of picture reclining and holding a dog
77	" "	" "	The Ceremonious Reception.	Königliche Galerie, Berlin.	Dwarf stooping, holding dogs to right of picture.
78	" "	" "	Scene from the story of Iphigenia.	Pinakothek, Munich.	Dwarf kneeling to centre of picture.
79	" "	" "	Marriage of the Emperor Frederick	National Gallery, London.	Nos. 75—79 look as if they had had the same dwarf for model, but in no case is it possible to determine the nature of the dwarfism clearly.
80	School of Veronese.	?	Il Doge Ziani e il Papa chiamano gli Ambasciatori per inviarti di Barbarossa.	Pal. Ducale, Venice.	Dwarf with dog to extreme right of picture, type uncertain.

SECTION I. *continued*

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
81	van Kellen, Jan.	?	Two dwarfs leading a large dog.	Collection Racynski, Berlin.	The elder dwarf is aged 22, the younger 18. Meige (<i>Nouv. Icon. de la Salp.</i> T. ix. p. 176, 1896) says the elder dwarf has rachitic curvature. He classes them as cases of myxoedematous infantilism.
82	?	?	Bébé (Nicholas Ferry) with a large dog.	Musée de Nancy, Pastel Portrait. Reproduced by Garnier, <i>Les Nains et les Géants</i> , p. 157.	Bébé is said to have shown signs of congenital syphilis combined with microcephaly and infantilism (Porak) on the authority of Richer, <i>L'Art et la Médecine</i> , p. 205. A portrait vaguely said to be 'from a' memorial card is given by Hastings Gilford, <i>The Disorders of Post-Natal Growth and Development</i> , London, 1911, p. 639 († related to Versailles portrait).
83*	Gobert.	?	Bébé (Nicholas Ferry).	Musée du Louvre, Paris.	Dwarf to centre of picture with dog, probably achondroplastic. An ateleiotic dwarf.
84	Deveria, Eugen.	1805—1865	The birth of Henry II.	Reproduced in Garnier, <i>Les Nains et les Géants</i> , p. 239, Paris, 1884.	Ateleiotic dwarf.
85	Painted by Garnier (?).	1802—1847 (circa)	Jakob Lehnén. Painter.	Reproduced in Garnier, <i>Les Nains et les Géants</i> , p. 189, Paris, 1884.	Achondroplastic (?) dwarf.
86	Painted by Reckers; drawn by Garnier.	?	Simon Jan Paap.	Royal College of Surgeons, London.	
87	R. Horne (?).	?	Owen Farrel.	Hunterian Museum, Glasgow.	
87 ^b	Hulett after Gravelot.	1742	" "	Reproduced in Garnier, <i>Les Nains et les Géants</i> , p. 217, Paris, 1884.	" "
88	Painted by Jeanne; drawn by Garnier.	?	Tom Thumb in costume of Frederick II.		Ateleiotic dwarf.
<i>Tapestry.</i>					
89	Queen Matilda (?).	11th century	Bayeux Tapestry with the dwarf commonly called Turold in that part of the Tapestry entitled "Ubi Nuntii Wilhelmi Ducis venerunt ad Wido."	Musée de Bayeux.	This dwarf does not look achondroplastic, he is represented as holding the horses of the ambassadors. The name Turold is worked above him, but probably applies to Turold, Constable of Bayeux, who is said to have been one of the ambassadors, see Comte Jules, <i>La Tapisserie de Bayeux</i> , Paris, 1878, Pl. XI.

90	Bronzino, Angiolo.	1502—1572	Feast of Pharaoh in the history of Joseph.	A 16th century Florentine tapestry from an old palace in Florence. In the Museum of Industrial Art, Milan.	The dwarf, to right, appears to be running and has short solid legs. Charcot says he looks athletic but has no deformity except a repulsive face (Charcot and Richer's <i>Les Déformés et les Malades dans l'Art</i>). He may be achondroplastic.
91	?	Middle of 17th century	Election of Cosimo di Medici I.	Villa Reale della Petraia, neighbourhood of Florence.	A macrocephalic dwarf, not of achondroplastic type, seated at the very centre of the picture.
91 ^{1st}	Flemish.	Early 16th century	Procession of women holding dwarfs in their arms and riding giraffes.	Robinson Tapestry, No. 375, 1906, South Kensington Museum.	At present (1911) under repair and not visible.

SECTION II. *Plastic Representations of Dwarfs.**Egyptian*¹.

92	?		Ptah-Seker-Osiris with head of Anubis.	22930 British Museum.	Achondroplastic dwarf-like figure.
93	"		Polytheistic figure uniting Khnoum, Anubis, Osiris, Horus, and the Soul.	1419 " "	" " "
94	"		Jug in the form of a woman.	30459 " "	" " "
95	"		Composite deity combining Ptah-Seker, Osiris, Amen, Thoth and Horus.	36453 " "	" " "
96	"		Ptah-Seker-Asar.	11157 " "	" " "
97	"		"	1211 " "	" " "
98	"		Ptah-Seker-Asar and Bes.	26316 " "	" " "
99	"		Bes.	15291 " "	" " "
100	"		"	22610 " "	Some achondroplastic features.
101	"		Steatopygous woman forming a jug.	Museum at Cairo.	" " "
102	"		"	29935 British Museum.	Achondroplastic type: see our Plate QQ (95).
103	"		Woman, said to be jug or vase.	E 2427 Ashmolean Museum, Oxford.	Achondroplastic type: see our Plate QQ (94).
104	"		Khnoumhotpu.	Boulak Museum, Cairo.	Some achondroplastic features: see our Plate QQ (96).
105	"		Queen of Punt.	Bas-relief at Deir-el-Bahari.	Achondroplastic looking dwarf with bathrocephalic head, see p. 35.
106	"	B.C. 1516—1481	Bronze figure of Bes.	Musée du Louvre, Paris.	Must be associated with the above figures: see our Plate QQ (93 ^{a-b}).
107	"		Ptah.	" "	See our Plate S (15), Fig. V.
108	?		Egyptian pygmies.	Musée du Louvre, Paris.	Many figures of this god as well as of Bes showing achondroplastic features
109	"		Egyptian dwarfs.	Reproduced in H. Rossolini, <i>Monumenti dell'Egitto e della Nubia</i> , T. II. Pl. 93, Pisa, 1832—44.	are in the Musée du Louvre. See also Charcot et Richer, p. 15. See our Plate VV.

¹ Naturally this section of the Iconography is illustrative, not exhaustive.

SECTION II. continued

Classical

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
110	Antique bronze statuettes.	?	Negro pygmies.	Collection Thiers, Louvre.	Racial dwarfs. See our Plate UU.
111	Statuette.	?	Roman Emperor Caracalla in caricature.	Musée du Louvre, Paris.	See our Plate S (15) Fig. X.
112 ^a	Antique bronze statuette.	?	Dwarf.	" "	Archaic bearded achondroplastic figure.
112 ^b	" "	?	Dwarfs.	" "	Most lifelike figures with adult faces and more rickety than achondroplastic looking limbs. See our Plate UU.
113	" "	?	A Dwarf fighting. No. 131.	Collection Oppermann, Bibliothèque Nationale, Paris.	Both achondroplastic dwarfs. See our Plate UU.
114	" "	?	Punishment in the cage (a kind of pillory used in China). No. 260.	South Kensington Museum.	? Rickety dwarf with marked lordosis.
115	" "	Circa 300 a.c.?	Aesop as Dwarf.		
<i>Medieval</i>					
116	Laurana, Francesco.	Latter half of 15th century	Triboulet. A Medal. Only the head is given with cap of buffoon.	Reproduced in Garnier's <i>Les Vains et les Géants</i> , p. 97.	Triboulet is stated to have been a dwarf with a very small head, who lived in 1466 at the Court of René of Anjou, King of Sicily.
117 ^a	Meit, Konrad?	1510—1530?	Painted clay bust of female dwarf (?).	Royal Collection, Windsor Castle.	Suggested as dwarf, by Bode, <i>Jahrbuch d. k. preuss. Kunstsammlungen</i> , Bd. xxiii. Heft. 4, S. iv.—xv. Berlin, 1901.
117 ^b	?	Before 1560	John Jarvis, painted wooden statue, dwarf page of honour to Queen Mary.	Once in possession of George Walter, Esq. Now? Reproduced in Caulfield's <i>Portraits</i> . See No. 149.	Ateleiotic dwarf. Not traceable.
118 ^a	Bologna, Giovanni da.	1524—1608	Equestrian statue of Cosmo I. One of the bas-reliefs has a dwarf in it to right centre.	Florence.	There can be no doubt that Nos. 118 ^a —118 ^c are the same myxoedematous dwarf. Meigs (<i>Nouv. Icon. de la Salp.</i> T. ix. p. 176, Paris, 1896) says No. 118 ^b is a case of myxoedematous infantilism. He has a prominent forehead, flat nose, thick lips, pendant cheeks covered with a short beard. Body a mass of fat. Cf. Carrie Akers (p. 361) and the Ragazza Gigantesca, No. 64 ^a ; see our Plate TT.
118 ^b	Cioli, Valerio.	1529—1599	Dwarf Barlino on a bronze fountain.	Museo Nazionale, Florence	Ateleiotic dwarf. See Pennant's <i>Account of London, Westminster and Southwark</i> , London, 1793, 3rd Edn., p. 244.
118 ^c	Cioli, Valerio?	"	Bronze Dwarf Morgante, upright, blowing horn in left hand and with a stick in right.	South Kensington Museum. Another in Berlin, and several at Florence (Bar-gello).	
119	? (Small sculpture).	?	Stone effigy of Jeffrey Hudson, c. 1640.	Formerly in Newgate Street over entrance to Bagnio Court, accompanied by W. Evans the gigantic porter to Charles I.	
120 ^a	Paduan master.	circa 1500	Two statuettes of the same nude dwarf.	{ K. K. Hofmuseum, Vienna. Museo Strozcoso, Milan.	Extremely stout, short arms and legs, latter not bowed. Genital organs not fully developed. Probably myxoedematous. Cf. Bode and Marks, <i>The Italian Bronze Statuettes of the Renaissance</i> , Vol. I. Plate LXIII., London, 1908.
120 ^b					

Modern

121	Jeanet (a surgeon).	1764?	Nicolas Ferry. Bébé. Statue in wax.	Musée Dupuytren, Paris.	Sent to the <i>Académie des Sciences</i> by Morand in 1764. Modelled from Bébé, dressed in his clothes with wig of his hair. See our Plate RR (99).
121 ^{1/2}	Chelsea Porcelain.	circa 1765	Male and female dwarfs.	Schreiber Collection, No. 167, South Kensington Museum.	Grotesque male dwarf, uncertain type; (i) ateleiotic female, expression ateleiotic.
122	Bonomi, Joseph.	1796—1878	The dwarf Joseph Boruwaski.	University of Durham (1837).	Ateleiotic dwarf: see our Plate II (67) and (68).
123	Richer, Paul.	Last quarter 19th century	Statuette of a boy aged 19. 103 cm.	Modelled about 1898.	Meige (<i>Your. Icon. de la Salp.</i> Vol. XI. p. 136, Paris, 1898) says this is a case of myxoedematous infantilism.
SECTION III. Prints and Books.					
124	J. Wierix.	2nd half 16th century	Feast of Dives, with Dwarf.	Jan Wierix's <i>Bible</i> , 1594.	The dwarf is teasing a monkey and looks rather achondroplastic, the arms seem short but the curvature of the legs may be due to his position.
125	De Malery, C.	"	Prodigal Son, with Dwarf.	Jan Wierix's <i>Bible</i> , 1594. The dwarfs in these engravings are reproduced in House's <i>Year Book</i> , London, 1838, pp. 16—19, and p. 66.	The dwarf is represented with fool's cap and bells mocking the Prodigal Son. He appears well proportioned and looks like a boy—probably from an ateleiotic model.
126	Lycosthenes.	?	Giant and dwarf of Nicephorus Callistus.	Reproduced in Garnier, <i>Les Arts et les Génies</i> , 1844, p. 168.	
127	?	?	Miniatures of Rich ^d Gibson and his wife.	Reproduced in Walpole's <i>Anecdotes of Painting</i> , 1849, Vol. II. p. 533.	Ateleiotic dwarf. See Fig. 699, text p. 360 and No. 185 below.
128	?	?	Mute and Dwarf standing side by side.	See Paul Rycaut's <i>The Present State of the Ottoman Empire</i> , London, 1668, p. 24.	Dwarf does not appear achondroplastic but has a large head.
129	Le Clerc, Sebastian.	1637—1714	Muets et Nains du Grand Seigneur.	Rycaut's <i>Histoire de l'état présent de l'Empire Ottoman</i> , 1670, trans. from the English.	This picture is not a copy of the English original and is inferior to the English. Another version appears in the Amsterdam French Edn. of 1678.
130	Gole, J.	1660—1737	"John Worrenberg."	Mezzotint Engraving. 1689, Print Room, British Museum. Short inscriptions in French and Dutch.	Portrait of achondroplastic (?) dwarf and normal man.
131	Oliver, John.	1688	"The true Portraiture of John Wormbergh."	Engraved about 1688. Print Room, British Museum.	Dwarf aged 38, carries a sword and stick and is elaborately dressed. Long inscription in English, which among other matters states he was 2' 7" high.
132	Schenk. P.	1645—1715	"Hans Worrenberg."	Whole length mezzo-tinto portrait, Print Room, British Museum.	This dwarf is still more elaborately dressed than in No. 131. In the pictures this dwarf looks clumsily made and appears to have no neck. He looks something like Wybrand Lolkes. His height is small for achondroplasia and type hard to define.

¹ An apparent variant of this simply entitled: "J. Worrenburg. The Swiss Dwarf" is in Eugenics Laboratory.

SECTION III continued

Artist	Dates of Artist	Subject	Place	Description of Dwarf
133* Drapentier, J. or Drapentière, J.	c. 1674	Portrait of Wormberg.	England? With eight lines of Dutch and four of English. Mentioned by Wood, <i>Giants and Dwarfs</i> , London, 1868, p. 304.	Type? No copy seen.
134* ?	About middle of 17th century	Gomme Lapon.	In possession of E. J. Wood in 1868.	E. J. Wood in <i>Giants and Dwarfs</i> , 1868, pp. 285, 286 says "An ancient and very rare foreign engraving in the possession of the author represents the full-length figure of a dwarf standing on a chequered floor. He has a large head, which is bald, a wide open forehead, a small moustache and a long beard. He wears a short braided tunic, baggy breeches, stockings and buckled shoes. His hands are clasped in front of him and he has the appearance of a man in thought. A superscription in French tells us that his name was Gomme Lapon and that he 'est habitant des frontières des sauvages'; his age was about 110 years (!) and his height 2 ft. 4 inches: he was very well shaped and proportioned 'joli de figure' and his white beard was more than a foot long. This engraving is undated but we conjecture that it was issued about the middle of the 17th century."
135* Alessandri.	1740—?	French engraving of the dwarf Ackenheil. It is undated.	In the possession of E. J. Wood in 1868. A copy is in the <i>Collection Hennin</i> according to Garnier.	Wood, <i>Giants and Dwarfs</i> , p. 379. "Engraving represents a neat and pretty male dwarf dressed in military costume and wig, holding in his left hand a plumed hat and standing on a terrace beside a flag and drum. In the foreground lie a sword, bayonet and knapsack. The superscription in French tells us that his name was 'Akenail,' and that he was born in Germany in the Black Forest. He was 15 years of age, 30 inches in height and had not grown taller since he was 5 years old. He was very beautiful, gay, lively and active and he learned easily and retained his knowledge. About May 1788, this dwarf was exhibited in Paris."

136	Probably Cornelius Galle (the Elder).	1576—1636	Dutch engraving representing a procession at the Coronation of Cosimo di Medici.	Original? Reproduced in <i>Nouv. Icon. de la Salp.</i> 1901, T. xiv. p. 372.	There are two adult dwarfs in gala dress. One who is partly hidden looks well proportioned, the other is called an achondroplastic dwarf by Meige, who describes him as "trapu, les jambes fort arquées mais surtout on remarque l'exiguité de ses bras." Latin inscription under engraving. Achondroplastic dwarf.
137	Philip Galle, after Jan van der Straet.	1537—1612	Coronation of Cosimo di Medici by Pope. Dwarf to centre of picture.	Print (1583) with Latin inscription. South Kensington Museum (95. G. 36).	Achondroplastic dwarf.
138	Nilson, J. E.	1721—1788	The dwarf Catherina Helena Stöberin.	Portrait done in 1775. South Kensington Museum (G.6a).	Ateleiotic dwarf. 2 ft. 4 ins. at 16·5 years.
139	Le Bas, M. O.	1783—1843	The dwarf Mons. La Grandeur.	Engraving reproduced in Garnier, <i>Les Nains et les Géants</i> , 1884, p. 193.	
140			"Madame" Bébé and her sister.	Lithograph in <i>Le Théâtre, Comte</i> . Reproduced in Garnier, p. 67.	Ateleiotic dwarf.
141	?	?	Thérèse Souvray, betrothed to Bébé.	<i>Dict. des Sci. Méd.</i> T. xxxv. 1819.	Ateleiotic dwarf: see our Plate II (70).
142	R. Page?	?	Dwarf Bertholde of Berganoma.	Engraved from original picture (i). In Eugenics Laboratory.	Achondroplastic Dwarf: see Wilson's <i>Wonderful Characters</i> , Vol. 1. p. 453.
143*	C. F. Fritsch.	?	Dutch engraving, Wybrand Lolkes.	Print Room, British Museum.	Achondroplastic dwarf.
143b*	Wilkes. Published C Johnson.	Last half of 18th century	Wybrand Lolkes and his wife.	? Copied in <i>Le Magazine Pittoresque</i> , Paris, 1839, p. 333; Smeeton's <i>Biographica Curiosa</i> , London, 1822, p. 38 and Wilson's <i>Wonderful Characters</i> , London, 1821—22, Vol. II. p. 375.	Achondroplastic dwarf. See Wood, <i>Giants and Dwarfs</i> , p. 383.
144*	Van Assen, A. Hend-schel. Published by Boruwalski, 1788.	1787	Dwarf Joseph Boruwalski in uniform with sword holds a bird on his hand towards baby held by lady with large hat (B., wife and child).	Print Room, British Museum.	Ateleiotic dwarf.
144b	Van Assen. Engraved by R. Cooper. Published by Robins and Co.	1822	Practically same engraving as above.	"Also in "Eugenics" Laboratory).	" "
145	Van Assen, A., delin. et sculpt. Published by Boruwalski.	1788	Very similar to the above two, except that B. rests his elbow on a table, and the lady has discarded large hat for a floral decoration.	Print Room, British Museum.	" "
146*	L. Downman, A.R.A., delt. W. T. Fry, sculpt. Published by George Andrews, Durham.	1821	Joseph Boruwalski. "The little Count was born in Polish Russia, 1739, married in 1780, he has three children." Hatless, ordinary costume, showing to waist, holding up one finger and addressing a lady in profile.	" "	" "
146b	Published by James Dundee.	1809	Mr O'Brien and Count Boruwalski (Giant and Dwarf).	Origin? Print in possession of Eugenics Laboratory.	? if really Boruwalski although so entitled. See <i>Eccentric Mirror</i> , Vol. 1. No. 2, London, 1813.
147	?	?	Dutch Engraving of Jean Hannema ('Admiral van Tromp').	Reproduced in Garnier, <i>Les Nains et les Géants</i> , Paris, 1884, p. 225.	See Fig 735. Probably ateleiotic.

SECTION III. continued

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
148*	Mills, J.	Early part of 19th century	Engraving of Thos. Allen and Lady Morgan. 1803.	Copy in the possession of E. J. Wood in 1868.	They are represented holding each other's right hand. Thos. Allen was aged 35 and was 3 ft. 3 in. high. Lady Morgan, aged 45 was 3 ft. in height.
149	Painted Walker, engr. Clamp.	1795	John Jarvis, picture of a statue. From the original statue in the possession of George Walker, Esq. Published by J. Caulfield, March 1, 1796.	Caulfield's <i>Portraits, Memoirs and Characters of Remarkable Persons from the reign of Edw. III. to the Revolution</i> , Vol. I. p. 8, London, 1813. Print Room, British Museum (C. X, P. 2, 1851. 3. 8. 363).	He was page of honour to Queen Mary. Height 3 ft. 8 in. Died 1558 or 1560, aged 57. The statue was carved in oak and was for 200 years in the family of George Walter, Winchester Row, Lissou Green. He is an ateleiotic dwarf or a case of infantilism. Probably ateleiotic. See No. 117 ^b .
150	Painted Mytens, engr. G. P. Harding and James Shaw.	Dec. 1, 1810	Jeffrey Hudson, with dog, from Woodford picture. See No. 45.	Print Room, British Museum (C. X, P. 5, 1851. 3. 8. 334).	Ateleiotic Dwarf: see our Plate HH (66).
151	Engraved by J. Droe-	1596—1652	Jeffrey Hudson, standing beside a table with a curtain behind to left of picture. Latin lines above and below.	Print Room, British Museum (and Eugenics Laboratory).	Miniature copper engraving. <i>New Year's Gift by Microphilus</i> , 1636. Far the best of all the Hudson prints.
152	?	?	Another copy with verse: "Gaze on with wonder and discern in me, The abstract of the Worlds Epitome," and Latin lines.	Print Room, British Museum (as in No. 150).	A copy in Granger, Vol. II. p. 403, 1792. Also copied by Trettel in broad frame.
153	?	?	John Wormberg.	Caulfield as in No. 149.	Achondroplastic dwarf.
154	?	?	Nannette Stocker and Johann Hauptmann.	Kirby's <i>Wonderful and Eccentric Museum or Magazine of Remarkable Characters</i> , Vol. v. p. 228, London, 1804—1820.	See our Plate II (69). Ateleiotic Dwarfs. Nannette Stocker was 33 in. and Hauptmann 36 in. high.
155	H. Gravelot.	c. 1742	"Owen Farrel, the Irish Dwarf." Inscribed to Cromwell Mortimer by James Hulett. O. F. stands in street with a staff in his hand, two boys behind point at him and three figures with a wheelbarrow looking at him. Simon Paap (with the Giant James Toller). George Romondo.	Print Room, British Museum (C. X, P. 8, 1860. 6. 23. 12). There are several variants of this. Reproduced Kirby as in No. 154. Vol. v. p. 364. Kirby: see No. 154, Vol. II. p. 145. Kirby: see No. 154, Vol. III. p. 113.	See our Plate KK (74). Probably achondroplastic, but this has been questioned. His skeleton which was preserved would settle the question, but it is untraceable.
156	?	?			See our Plate RR (98). ? Myxoedematous Dwarf.
156*	?	?			See our Plate KK (73). Rickety Dwarf.
157	?	1815	Gulliver in the Island of Giants.	Engraving. Reproduced in Garnier, <i>Les Nains et les Géants</i> , Paris, p. 205.	Gulliver and 3 dwarfs.

158	B. Smith Pinx., Burgh fecit.	H.	?	Owen Farrel standing with staff in one hand and hat in other. In two copies, in one is written "The celebrated Irish Dwarf of a surprising strength." The other is reversed and has printed on it "The Strong Dwarf."	Print Room, British Museum (C. X, P. 8). Eugenics Laboratory. Caulfield's <i>Portraits, Memoirs and Characters of Remarkable Persons from the Revolution to the reign of George II.</i> , Vol. III. p. 230, London, 1819.	Probably achondroplastic. Both these as well as No. 155 differ from the Kirby print: see No. 155.
159	?			Little Will at the Turk's Head Coffee House.	Print Room, British Museum (C. X, P. 8). Reproduced in Caulfield (see No. 158).	Described as a perfect Ragoten, of a squat figure, large head and very clumsily limbed, yet a man of sound sense and discernment. The figure is certainly not typically achondroplastic. It has short legs, but very long arms; head looks full size and trunk nearly full size; head not least resemblance to usual achondroplastic type; chin is slightly receding and large nose. Legs are hidden by apron so nature cannot be considered. Giant and Ateleiotic Dwarf.
160*	?		?	Cromwell's Porter and Jeffrey Hudson.	Folio copper engraving without letters or date. Eugenics Laboratory.	
160 ^b	R. Page.		?	Jeffrey Hudson and Charles I.		Possibly a reproduction of some unlocated picture. Ateleiotic Dwarf.
161	"		1822	Jeffrey Dunstan, Mayor of Garrett. (Probably also as an independent engraving. Copy in Eugenics Laboratory.)	Wilson's <i>Wonderful Characters</i> , Vol. I. p. 88 and p. 216, Vol. II. p. 375, Vol. III. p. 385, London, 1821—22.	He was dwarfish in size and knock-kneed and his head was disproportioned to his body. He looks rickety.
162	R. Cooper.		Last half of 18th century	Wybrand Lolkes and his wife.		Copied (?) from Wilkes' engraving, see No. 143.
163	Van Assen.		"	Boruwalski, wife and child.		Reproduced from van Assen's engraving, see No. 144 ^a .
164	R. Cooper.		"	Wybrand Lolkes and his wife.		Copied (?) from Wilkes' engraving, see No. 143.
165	Van Assen.		"	Boruwalski, wife and child.	Smecton's <i>Biographica Curiosa</i> , pp. 1, 38, 75, 205, 235, London, 1822.	Reproduced from van Assen's engraving, see No. 144 ^a .
166	?		?	Jeffrey Dunstan.		Same picture as is given in Wilson.
167 ^a	?		?	Simon Paap.		Full-length picture: cf. our Plate RR (97).
167 ^b	Worldidge?		c. 1773	Madame Teresia, the Corsican Fairy.	? Copied by R. Cooper.	Ateleiotic Dwarf, height 34 inches.
168	?		?	Tom Thumb and his carriage.	Lithograph of the time. Reproduced in Garnier, <i>Les Nains et les Géants</i> , Paris, 1884, p. 211.	Ateleiotic Dwarf. Cf. our Plate AA (43).
169	?		?	Part of the Piazza San Marco with a dwarf.	Yriarte's <i>Venise, Histoire, Arts, Industrie, La Ville, La Vie</i> , Paris, 1877, p. 141.	Possibly a photo or picture done by Yriarte.
170*	?		1st half of 19th century	Robert Skinner and his wife Judith standing one on either side of a tall man.	A rude woodcut referred to by Wood: <i>Giants and Dwarfs</i> , London, 1868, p. 351.	Probably ateleiotic. See our p. 361.

SECTION III. *continued*

	Artist	Dates of Artist	Subject	Place	Description of Dwarf
171 ^a	? (G. Wright? R. Hancock?)	No date	"Edward Scofield," 3 ft. 2 in. high. Deputy clerk of St Chads, Shrewsbury.	Print Room, British Museum (C. X, P. 9, 1851. 3. 8. 627).	This dwarf is probably ateleiotic, but he has on a long coat, and no certain diagnosis can be made. C. J. Caulfield's <i>Portraits</i> , Vol. III. p. 173. Type doubtful.
171 ^b	G. Beckham.	Reign of George II. 1787	Cornelius Caton, of the White Lion, Richmond.	Copy in Eugenics Laboratory.	
172	S. I. ?		Kelham Whitelamb, 34 inches high, born at Wisbech in Cambridgeshire. Standing beside his "cupboard."	Print Room, British Museum (C. X, P. 9, 1851. 3. 8. 719).	
173	Printed by Rowney and Forster.	?	John Tarr, aged 67 years, 4 ft. 3 in., born at Bampton. No date.	Print Room, British Museum (C. X, P. 10, 1851. 3. 8. 673).	Appears to be achondroplastic. Print says he was 15 years ostler at the White Horse, 12 years Boots at the Three Tuns, Tiverton.
174	Published by H. Rowe.	1821	Andrew Whitson, born Feb. 10, 1770, died 1836.	Print Room, British Museum (C. X, P. 10, 1851. 3. 8. 723).	A crippled dwarf. ? A case of birth palsy.
175	Painted by J. H. Desvignes. Engraved by Charles Hunt, published by J. Moore.		The Miniature John Bull, etc. (see our p. 363).	Print Room, British Museum (C. X, P. 12, 1872. 10. 12. 4455).	Probably ateleiosis.
176	Drawn on stone from Nature by A. Lambert, printed by R. Martin.	1840—1860	George Trout, one of the Porters to the Honourable, the House of Commons.	Print Room, British Museum (C. X, P. 12, 1851. 3. 8. 653).	Probably achondroplastic.
177	A. Walker, sculpt. (in reign of Charles I.).	?	Richard Gibson, with a small portrait of Mrs Gibson in corner.	<i>Collectanea Biographica</i> , Vol. XLII. No. 45.	Adult face without hair; long hair on head in Stuart fashion, collar hides neck, bridge of nose not sunk. Probably ateleiotic.
178 ^a	Anon.	After 1709	The wonderful and surprising English dwarf, 2 ft. 8 in. high. Born at Salisbury, 1709. Has been shown to most of the Nobility and Gentry of Great Britain.	Print Room, British Museum (C. X, P. 7, 1872. 10. 12. 4339).	Probably ateleiotic, female dwarf, features of condition not well shown.
178 ^b *	Anon.	First half of 18th century Published 1771	The wonderful, strong and surprising Persian Dwarf, 3 ft. 6 in. high, etc. The Exact Representation of those two very Remarkable Persons, Mr Bamfield the Staffordshire Giant and Mr Coan the Norfolk Dwarf, etc.	Copy recently on sale in London. Print Room, British Museum (C. X, P. 9, 1851. 3. 8. 73).	Type unknown, bandy legged. Cf. Wood, <i>Giants and Dwarfs</i> , p. 310.
179	Engraved by James Roberts, sold by Hawksworth and by H. Roberts.				Coan was probably ateleiotic. The print states that it is drawn by Mr Rackstraw's permission, as he has moulded them from the life, and that the dwarf did not exceed 3 feet and died at 36 years of age. His later days were spent in Chelsea.
180	Published by John Bowles.	First half of 18th century	Grotesque Pigmy Figures.	South Kensington Museum (95. H. 13).	Folklore Dwarfs, male and female, in a series of 12 plates, entitled: <i>The Lilliputian Dancing School</i> , etc.

SECTION IV. *Drawings and Etchings.*

181	Mantegna Andrea.	1431—1506	Dwarf handing a packet to one of two men engaged in conversation. A boy stands watching.	The original is said to be in a Collection at Padua. It is reproduced in Charles Yriarte's <i>Venise, Histoire, Art, Industrie, La Ville, La Vie</i> , Paris, 1877, p. 141.	The dwarf is not deformed, but the head is slightly too large for the body.
182 ^a	Callot, Jacques.	1592—1635	Etchings of single dwarfs.	These etchings are in the Print Room, British Museum and are numbered 748, 749, 752, 753, 754, 756, 758, 761, 763 in Meaume's Catalogue. National Museum, Stockholm.	Deformed dwarfs with short legs. Probably models were achondroplastic.
182 ^b	Rubens, Peter Paul.	1577—1641	Drawing of Earl of Arundel's dwarf Robin.	Original? Reproduced in Charcot and Richer, <i>L'Art et la Médecine</i> , Paris, 1901, p. 251.	Probably ateleiotic. Sketch for or of Ateleiotic Dwarf.
183	Persian artist.	16th—17th century	Drawing of dwarf. Old man with white beard, bent with age or stooping to the dwarf.	Reproduced in C. Jacobi's <i>Acqueforti dei Tiepolo Collezione di 100 Tavole</i> . Plates 90 & 91. Ongaglia's Edition, Venice, 1879.	These dwarfs are very similar to those in his pictures and are in semi-recumbent positions: see Nos. 75—79.
184	Tiepolo, Giovanni Battista.	1693—1770	Two studies of male and female dwarfs and dogs.	Royal Library, Windsor.	Ateleiotic Dwarfs. Seems to be original of No. 127.
185	?		Water colour in sepia. King in crown and robes uniting hands of dwarfs: above oval bust portraits of Richard Gibson and his wife.		
186	Richard Gibson.	?	Painting of Gibson by himself.	Print Room, British Museum.	Neck looks short and face appears younger than in No. 127.
187	Du Plessis (James Paris).	1730—1733	John Grimes.	3253. Sloane Manuscripts, British Museum.	John Grimes of Newcastle-on-Tyne, aged 57, 3 ft. 8 in. in height. He was a short and very thick man as broad as he was long from hand to hand. He died 1736, was dissected and his skeleton set up. The picture represents him fully clothed, he appears well-proportioned with straight legs, but he has no beard and has a boyish appearance.
188	"	"	Anne Rouse.	5246. Sloane Manuscripts, British Museum. A Short History of Prodigious and Monstrous Births, of Dwarfs, Sleepers, Giants, Strong Men, Hermaphrodites, Numerous Births, and Extreme Old Age.	"Anne Rouse, born near the city of Norwich, 24th June, 1690, aged 27, but 2 ft. 2 in. high. Being very well-shaped, well-proportioned and very strait." In the picture the legs look rather short and the arms rather long for the body.

SECTION IV. *continued*

Artist	Dates of Artist	Subject	Place	Description of Dwarf
189 Du Plessis (James Paris).	1730—1733	John Worrenbergh or Wormberg.	5246. Sloane Manuscripts, British Museum. A Short History of Prodigious and Monstrous Births, of Dwarfs, Sleepers, Giants, Strong Men, Hermaphrodites, Numerous Births and Extreme Old Age.	He was of Hartshousen, in Switzerland, aged 39 and 2 ft. 7 in. in height and was seen by Paris, 1689. "He was as big in all his members as any grown man and as strong." The legs look very thick but are not short in proportion to the trunk. The arms do not look short. See Nos. 130—3.
190 " "	"	A dwarf black man mounted on dwarf horse.	Ditto. (Cf. also Granger, <i>A Biographical History</i> , Vol. iii. p. 48, London, 1806, who refers to <i>Spectator</i> , No. 271.)	He was but 3 ft. high and aged 32 when Paris saw him in London, 1712. "He was strait, well-shaped and proportionable, he had a wife which was not 3 foot high, at 30 years of age, strait and proportionable as any other woman, she c ^d dance extraordinary well, though big with child, and also the little Turkey horse that was but 2 ft. odd inches high and above 12 years old." Paris also says that in 1715 he saw a little black man 3 feet high and 25 years old.
191 " "	"	Hannah Weston.	Ditto.	"She was born at Leeds in Yorkshire in 1685, was 20 years of age and but 2 ft. 2 in. high, very straight and well-shaped, she c ^d sing dance and play with the castanets excellently well." Represented fully clothed.

Addendum. No. 35*. Engravings from Jan van der Straet's pictures (besides Nos. 136 and 137) frequently show dwarfs. Thus in the Print Room, British Museum we find: (1) By P. Galle, *Christ before Pilate*. Dwarf with helmet holds Christ's robe, thick-set, but hardly achondroplastic. (2) By C. and T. Galle, *Herod and Salome*. In right-hand corner, achondroplastic dwarf with cap, sword and extended arm. (3) By A. Collaert, *Christ in the Manger*. Right-hand corner, small figure blowing a horn, might be an ateleiotic dwarf. (4) By Collaert and Galle, *Christ coming away from Pilate*. Two dwarfs, the first, possibly achondroplastic, holds a wand in one hand and points jeeringly at Christ with other; the second, much taller but still a dwarf, has a sword and holds the rope which binds Christ's hands.

Corrigendum. No. 46*. Just as this sheet goes to press a letter has been received from Mr A. W. Drury stating that Lord Fitzwilliam's picture is a full length portrait of Queen Henrietta Maria with the Dwarf by her side and that it was painted by Vandyck. A copy of the same is in the possession of Mr George C. Wentworth Fitzwilliam at Milton. Cf. No. 49.

PEDIGREES.

SECTION I. ACHONDROPLASIA.

PLATE LI. ACHONDROPLASIA. PLATES LII. AND LIII. ACHONDROPLASIA AND PROBABLE ACHONDROPLASIA.

PLATE LI. Fig. 608. *Rischbieth's Case*. Fig. 620 below was given by Boeckh, and published 17 years ago (1893). There has recently been a collection of 53 dwarfs on exhibition in London, at Olympia. Amongst these were five achondroplastic individuals, three females and two males. One of the former I recognised as Elizabeth or Kathie Kipke, one of Boeckh's cases, remembering her appearance from the photograph shown in his paper. She gave me the details of the following pedigree. In order to avoid mistaken identity I then asked her:—Whether she had ever been in the Heidelberg Frauenklinik, and Whether she had ever undergone any operation for the birth of her children? To both the answer was "Yes." To the second it was "At each birth." For the first at Heidelberg. Boeckh's photograph of this woman is shown in his paper, and it can be compared with a photograph of her taken at the present day. From the resemblance of these and from the pedigree she gives (though this does not, precisely, agree with that of Boeckh) and from the family name there can be no doubt as to the identity of the individual. This pedigree does not differ in any essential from that of Boeckh (except as to the nature of IV. 12, who though a dwarf is not achondroplastic), but represents the family 17 years later. It was made January 18th, 1910. This account was given by IV. 14, Elizabeth Dorffler (*née* Elizabeth or Kathie Kipke), whose photograph, with those of her daughter, V. 8, and of her elder sister, IV. 11 (all three of whom are achondroplastic) is shown in Plates Q (9), (10) and FF (62). With them are photographs of IV. 12, husband of IV. 11, and their son, V. 6. These two are ateleiotic. IV. 14, Elizabeth Dorffler, *née* Kipke, aged 42 years, born in Pomerania. Height¹ approximately 3' 6", head and face disproportionately big for height. Head square, with prominence of parietal eminences. Frontal eminences less prominent than usual in achondroplasia. Bridge of nose not much depressed, nose large, with wide nostrils but not tip-tilted. Cheek-bones slightly prominent. Looks about her age. Hair of scalp not thin and in normal condition. Her arms are very short; the distal extremities of the fingers do not extend beyond the level of the region of the great trochanters as far as could be judged. The hands are disproportionately large. They are very broad, short and thick with thick fleshy fingers. The fingers show an approximation to equality in length but this is not complete. They show the hand "en trident," and the peculiar formation of the segments, as it were three cylinders of progressive diminution in diameter placed end to end. The pulp of the fingers extends beyond the nail. Gait "rolling" or "waddling." Movements fairly quick. Those of the hands look clumsy but are quite accurate. Very intelligent and quick mentally. Reads and writes well. As this individual could not be examined without her clothes no other points could be made out. (For these see Boeckh's photograph and account.) By IV. 13, a man of ordinary size, she had a female illegitimate child, V. 7, delivered by Caesarian section in Heidelberg Frauenklinik. (Boeckh's account.) She married a German, of height about 5' 7" and by him had three children, all born in Zürich (V. 8, 9 and 10). Of these, V. 9, and V. 10, died aged 5 months and 3 months respectively. V. 8, aged 17 years, is an achondroplastic dwarf. (Plate Q (10).) She resembles her mother in stature, length of arms, hands and in all other respects, that of age (she looks her age) and that the shape of her head is more typical, the frontal as well as the parietal eminences being prominent and the bridge of the nose somewhat depressed. The nose is large, with wide nostrils, but is not tip-tilted. She is very intelligent and reads and writes well. IV. 11, a sister of IV. 14, aged 43 years, Dagmar Huther (*née* Kipke, Plate Q (9)), of the same height and like her achondroplastic. Typical in all respects except that, like her sister, the frontal eminences are not very prominent and the bridge of the nose not much depressed. She married IV. 12, a dwarf, described by Boeckh as a true dwarf of proportioned members. His photograph is shown here and it will be seen that he shows none of the features of achondroplasia, but is an ateleiotic or true dwarf. He died aged 44 years, of some disorder accompanied by palpitation of the heart (Herzklopfen, ? exact nature of this malady²). V. 6, aged 18 years (the son of IV. 11 by this dwarf, IV. 12), is described as "the smallest man in the world." His height is a little over 2'. (Plate FF (62).) He has none of the features of achondroplasia, but is an ateleiotic or true dwarf³.

¹ No measurements were permitted. The height had to be inferred by comparison with surrounding objects.

² Boeckh says he died, aged 47, of Herzschlag.

³ If the account of the parentage of this individual be correct, he is unique. (1) Because he is one of the very few cases on record of a true dwarf being produced by a true dwarf parent of either sex, and (2) because one parent is achondroplastic and the other ateleiotic. An achondroplastic dwarf of either sex may produce children. These may be achondroplastic or normal. Ateleiotic dwarfs, on the other hand, are usually sterile, but have been known to produce offspring. In most recorded instances, however, where this has occurred, such offspring, if they survived, have grown to normal dimensions. The parentage of this individual may have been adopted for show purposes. The alleged father, however, has growth of hair about the face and may therefore have been potent.

IV. 11 has had no other children. IV. 9, a normally grown sister of IV. 11 and 13, is now aged 45 years. She is married to a man of ordinary size, IV. 10, and has had five children, V. 1, 2, 3, 4 and 5. Of these V. 1, 2 and 3 are sons, still living and normally grown. V. 4, a daughter, achondroplastic, died aged 3 years. V. 5, a daughter, normal, died aged 3 years. Besides these three sisters, in generation IV., there are three brothers, IV. 6, 7 and 8, and one sister, IV. 5, all living and all normal. ("Wir sind sieben, fünf gross und zwei klein.") Nothing is known of their descendants, if any. In Generation IV., also, four normal children, IV. 1, 2, 3 and 4, died in infancy. III. 8, the father of IV. 11 and 12, was a dwarf like these, but was not quite so small. He died in Berlin aged 85 years. He had two brothers and two sisters, III. 9, 10, 11 and 12, all of normal size. Nothing is known of their descendants, if any. His wife, III. 7, was of ordinary size. She had three brothers and three sisters, all of ordinary size, as were their parents, II. 1 and 2. Both the father, II. 4, and the grandfather, I. 1, of this achondroplastic dwarf, III. 8, as well as one of his aunts, II. 5, were "little" people. They were all of about the same size. "They were small but not so small as we" (Sie waren klein, aber nicht ganz so klein wie uns) and did not show the peculiar shape that her sister, her daughter and herself show. She indicates by raising her hand their supposed height which is 4' to 4' 6".

Unfortunately permission was not given to make measurements, X-ray examination or scientifically accurate photographs of any of these individuals and therefore the above account is of less value than it might be. (Unpublished.)

Fig. 609. *Rischbieth's Case*. IV. 2, Maud S—, aged 15 months. Achondroplasia, one of twins, her twin brother being of normal growth. A large, square head, equal in circumference to that of her twin brother. Frontal and parietal bosses prominent. Bridge of the nose depressed, but not much flattened. Nose slightly tip-tilted. The lower part of the face compared to the forehead is small and shows fairly well the "inverted pear" appearance spoken of by French authors. The length of the trunk is about equal to that of her brother, but the limbs are markedly shortened (micromelia). The finger tips do not extend beyond the great trochanters in full extension. The shortening affects the arms and thighs more than the forearms and legs, i.e. the micromelia is of rhizomelic type. The limbs are not massive, as is the rule in achondroplasia, but are rather thin. The subcutaneous tissues, however, seem to be somewhat increased and the normal skin folds are all exaggerated. All the long bones of all four limbs are curved. The curvatures occur at the junction of epiphysis and shaft. The epiphyses are enlarged. The hands and feet are relatively short, broad and thick. The hands show, particularly well, the approximation to equality in the length of the fingers. The separation of the distal extremities of these in complete extension is also well shown, but better in the right hand than in the left. The abdomen is prominent, but there is no lordosis. On the contrary there is an angular kyphosis in the lumbar region, this is apparently painless, is not tender on palpation and there is no rigidity in it. It is a rickety curvature. But the ribs are not beaded and there are no other signs of rickets. The first tooth appeared at the age of 13 months. The infant was bottle-fed since birth. She is not a fat child, as is usual in achondroplasia. Intelligence apparently normal; she is beginning to walk and talk. IV. 3, twin brother of the last. A well grown and perfectly healthy child. No evidence of rickets. Cut first tooth at the age of 6 months. Beginning to walk and talk. Marked internal strabismus of left eye, a condition which his father, III. 2, also shows. IV. 1, born dead at full term. No peculiarity. III. 2 is of average size and is in good health. Nothing is known concerning his brethren or parents, all of whom "are living abroad." (Statement of III. 3 and II. 8.) III. 3, aged 28 years, mother of the twins, is of height 5' 6"; she shows no peculiarities and is in good health. III. 4, 5 and 6, aged 27, 25 and 21 years respectively, are of medium height and ordinary proportions. III. 7 and 8 died aged 6 weeks and 4 weeks respectively; cause of death not known; but they showed no peculiarity. III. 9, 10, 12, 13 and 14 were all seen. They are of average stature for ages (16 years, 15, 11, 10 and 6 respectively, and show no peculiarities. III. 11 died in infancy. Cause of death unknown, but he showed no peculiarity. II. 7 and 8 were both seen. II. 7 is of almost medium height (5' 5") and says his brethren and parents and all known relations as shown were of ordinary size. II. 8 is a little woman of height 4' 9". She is fairly intelligent, though illiterate. No appearances of achondroplasia either in hands, feet, arms or legs, cranium or face. She had 15 siblings, as shown. Four were males and one female. She has forgotten the sex of others. They were all of ordinary size and proportions. I. 1, 2 and 3 were "tall" or of medium size. I. 4 was "very short and stout." I. 5 was of medium height. (Unpublished.)

Fig. 610. *Rischbieth's Case*. Louisa D—. The account of this family was given by II. 11, the mother of the achondroplastic child, III. 3. The grandparents, I. 1, 2 and 3, were "tall," I. 4 was "short," but not a dwarf. Nothing is known of the great-grandparents. But none of the siblings of I. 1 or 2, nor any children of these were dwarfs. Those described as "tall" were as tall as herself or taller. She is a big and strong woman aged 35 years, of height, approximately, 5' 8". She is the youngest of a family of 11 children. None of these were small or in any way peculiar or deformed. The surviving brethren are nearly all as tall as herself, or taller. II. 1, 2 and 3 died young after measles. None of the children of II. 4 to 10 are in any way like her dwarf child. (She knows all about the peculiar points of this individual, having frequently heard doctors "demonstrating" the case.) II. 14, her husband, is an ex-soldier with

several war medals. Photograph was shown. An individual of medium height and good physique. He is the third son in a family of 7 children. None of these are "tall," some are of medium height, others rather "short," but none are dwarfs or in any way peculiar in build. None of the children of these are dwarfs, or in any way peculiar. II. 11, this woman herself, the mother of the dwarf, has had no miscarriages and no illness of any kind that she remembers. She is not alcoholic and shows no signs of syphilis. The achondroplastic child was born at full term. During the later months of this pregnancy she suffered considerably from abdominal distension, which was excessive. She had no trouble of this kind in her other six pregnancies. The labour was a very easy one, but "the waters drenched everything, there were such a lot of them" (Hydramnios). All the children, III. 1 to 7, were seen and examined except III. 1, aged 15 years, who is in domestic service, and III. 5, who died aged 11 weeks of epidemic enteritis. Their ages are:—11 years, 7, 5, 3 and 1 year 3 months. The youngest is well grown, he has facial eczema, but is otherwise healthy. All the others are healthy and well grown with the exception of the dwarf, III. 3, aged 7 years. She is a typical achondroplastic child. Her sister, two years younger, of about average size for age, stands taller by a head and neck. The head is relatively large, and square. Parietal bosses very prominent, but the frontal bosses not extremely so. Bridge of nose depressed but not much broadened. Nose somewhat tip-tilted or retroussé. All the limbs massive and markedly shortened. The finger tips do not extend in full extension beyond the great trochanters, instead of, as in the normal, to mid thigh. The shortening affects the arms and thighs (proximal segments) more than the forearms and legs (mesial segments), i.e. there is micromelia of rhizomelic type. All the long bones of the limbs are somewhat curved. The curves occur at the junction of the epiphyses with the shafts, rather than in the shafts themselves as occurs in rickets. The epiphyses are enlarged. The hands and feet are short, broad and thick. The fingers are short and thick. They do not show, very well, the usual approximation to equality in length. Their distal extremities remain separated from one another in complete extension (hand "en trident") and the segments of the digits form, as it were, three cylinders, of progressive diminution in diameter, placed end to end. The subcutaneous tissues are increased in thickness, giving the child an appearance of general adiposity. All the normal skin folds are exaggerated. There is marked lordosis, the buttocks are prominent and the abdomen very prominent. The trunk, relatively to the limbs, is of great length. It shows no peculiarities, with the exception of, possibly, some slight bulging of the sternum, convexity forwards. The dentition is normal for age. The face does not show the feature usual in this condition, namely smallness of the lower part in comparison with the upper, the "inverted pear" of French writers, or as it were an inverted triangle. Intelligence normal, but the mother states that she has a peculiar disposition unlike that of her other children. She is not mischievous, but is "full of tricks," delighting in such acrobatic feats as leaping from tables and chairs and the sudden springing from hiding with a shout, in the endeavour to startle the unwary. (Unpublished.)

Fig. 611. *Rischbieth's Case*. III. 1, Lili W—, aged 25 years, Parisienne. Music Hall Singer. Height about 3' 6". She has a large square head with marked prominence of the frontal and parietal bosses. The bridge of the nose is depressed and flattened; the nose is tip-tilted with large nostrils. The smallness of the lower part of the face when compared with the upper, i.e. reproduction of the shape of an "inverted pear" or triangle, is in her case not very marked. The length of the trunk is that of an individual of almost medium height; mammae well developed. The arms and legs are markedly shortened (micromelia). This affects the proximal segment more than the mesial, i.e. it is of rhizomelic type. The finger tips do not extend beyond the level of the great trochanters in full extension. All four limbs are curved and very massive. The epiphyses of the long bones are all enlarged. The hands and feet are short, broad and thick. The hands show marked separation of all the finger tips when the fingers are extended "main en trident." The fingers, which are of nearly equal length, are short, and each shows all appearance as of three cylinders, of progressive diminution in diameter, superimposed, corresponding to the proximal, mesial and distal segments of the digit, a condition which has also been described as "a conical shape of the fingers." Lordosis and abdominal prominence fairly marked. Intelligence good, vivacious. She answers all questions very promptly, laughs and jokes a great deal. She has a healthy complexion and says she is never ill. She wished to know the reason for this, since nearly all the other dwarfs she knows seem to be almost constantly ailing and attending a doctor. She "volunteered" the statement that she has had no children. The following family history was obtained from her mother, II. 3, aged 58 years, a woman considerably above the average height of her sex and very intelligent. She has 14 other children all living, 7 boys and 7 girls. (The order of birth of these is not shown.) All are of ordinary growth and proportions. Some are married and have children, all these are of ordinary growth and proportions. Her husband, II. 2, is of medium height. She is quite certain that all his brethren (of whom there are several), as well as all her own, are of ordinary stature and proportions. The parents of both, I. 2, 4, 6 and 7, were, she is positive, of ordinary growth, as also were their brethren as far as she knew them. She is an intelligent woman; she says that she has frequently been questioned with regard to the family history and knows of no one amongst the number of her relatives showing the peculiar characteristics of her daughter. She wishes to know why this member of her family alone shows these peculiarities. She "has asked many doctors why it is and they cannot tell her." (Unpublished.)

Fig. 612. *Apert and Sevestre's Case.* The father, II. 1, was described in detail by Apert, and the daughter, III. 2, by Sevestre. II. 1, M. Sicard, aged 37 years, circus clown or "eccentric comic artist." Height 1 m. 29 cm., but the length of the trunk is as great as that of the average normal, being 59 cm. from the upper border of the symphysis pubis to the episternal notch—a very great length for so short a man. In the normally proportioned adult the symphysis pubis is equidistant between the vertex and the soles of the feet. In this individual the measurement from vertex to symphysis is 85 cm., which if proportions were normal would correspond to a height of 1 m. 70 cm., instead of, as in this case, 1 m. 29 cm. The measurement between the upper border of the symphysis pubis and the soles of the feet is only 44 cm. instead of 85 cm. The upper limbs show similar shortening. In the adult of normal proportions the distal extremity of the middle finger reaches to the lower third of the thigh, whereas in this individual it extends no further than the antero-superior spine. All the segments of the limb take part in this shortening, but it occurs especially in the long bones of the thigh and leg, arm and forearm; the hands and feet on the contrary are less affected. *Measurements*:—arm, forearm, metacarpus and middle finger, 18, 14, 6 and 9 cm. respectively. In an adult of 1 m. 70 cm. these measurements would be 27, 24, 8 and 12 cm. respectively. The fingers and the metacarpus are thus shortened by $\frac{1}{4}$, the arm by $\frac{1}{3}$, the forearm by more than $\frac{1}{3}$. A peculiarity observed in the fingers is their approximation to equality in length, which is almost complete, and their separation from one another. In the lower extremity measurements taken from the usual points show that the thigh and leg have each the lengths 28 cm. instead of 47 cm., and the foot, from extremity of heel to tip of great toe, 18 cm. instead of 25 cm. Thus the length of the long segments is diminished by more than $\frac{1}{3}$, the foot by nearly $\frac{1}{3}$. The head is large, not only relatively but absolutely. It is 57 cm. in greatest circumference. Very muscular indeed (measurements are here given). Intelligence equal to the average as is shown by his profession. He is an accomplished gymnast and horseback acrobat. *Skeleton.* Radiographs show the bones to be very thick. They show no curvatures such as are seen at times in rickety bones. They are short, and thickened relatively to their length. Sites of muscular origins and insertions prominent. The normal angles of bones are exaggerated, articular surfaces broadened and enlarged, not only relatively to the length of the bones but absolutely. II. 2, wife of the last. She was of average size and proportions. (The account of the family is now carried on from that of M. Sevestre published some four years later.) III. 1 was the eldest daughter of II. 1 and 2, then aged 12 years. She was bigger than is usual for her age and of ordinary proportions. III. 2, Hortense Sicard, aged 7 years. Height, very small for that of a child of her age, 87 cm., which corresponds to that of the average of $3\frac{1}{4}$ years. A very obese child, weight 18 kg. 70 cg. The reduction in height is produced more by the limbs than the trunk. The latter measures, from episternal notch to upper border of symphysis pubis, 35 cm., about the average normal for her age. But the limbs are remarkably short, especially the upper extremities. The legs are longer than the thighs. (Normally the thigh is longer than the leg.) *Measurements.* Thigh from great trochanter to external condyle, 16 cm. Leg, external condyle to external malleolus, 18 cm. The femora was abnormally curved and enlarged at its upper extremity. A similar condition is shown by the bones of the leg. The upper end of the fibula shows greater length than is normal relatively to the tibia. There is genu valgum. An analogous condition is shown in the upper extremities. The distal extremities of the fingers reach to the level of the great trochanter but no further. (In the normally proportioned individual they extend as far as the lower third of the thigh.) It is the arm, rather than the forearm, that is shortened. *Measurements.* ("From the usual points.") Arm 10.5 cm., forearm 12.5 cm. The radius and ulna are incurved and are thicker than normal in their upper parts. Movement of pronation is more complete than normal and complete extension is impossible. Hands. These are short, broad and fleshy; the fingers are short, thick, solid and sausage-shaped; they are all of about the same length, 4.5 cm. The little finger is, however, a little longer than the others. This, combined with an exaggerated obliquity of the fingers, gives the hand a peculiar, special appearance. The abdomen is enlarged. The head is very large, globular; its greatest circumference is 55 cm., the frontal and parietal bosses are markedly prominent. The face is large and square, with large features and is fairly expressive. The nose, which is large, is depressed at the bridge and flattened; its extremity is upturned; the nostrils are large. The palate is contracted, it is high arched (Gothic). The teeth are well developed and dentition is normal. Two molars are present. Two median incisors shed in the upper jaw have not yet been replaced. In the lower jaw three incisors have been shed and a fourth is very loose. Two new incisors have appeared. They are well developed. Began to walk late, at about 2 years of age. She is now firm upon her feet but has a peculiarity in her gait dependent upon genu valgum. Intelligence good and corresponds to that of a child of her age, 7 years. The accouchement had been difficult because of the size of the head which was larger than normal. *Illness.* Suppurative adenitis in the right submaxillary region at the age of 2 years. No other illnesses. The mother stated that this child's father was achondroplastic. "This statement of the mother concerning his appearance was confirmed by several of my students, who, having seen this man in certain institutions in Montmartre observed a close resemblance in it to that of this child." No note of any brethren of III. 1 and 2, nor of the parents, brethren or collaterals of II. 1 or 2. (Bibl. No. 386, p. 288, and Bibl. No. 492, p. 574.)

Fig. 613. *Guéniot and Potocki's Case.* Three accounts of this case have been given, each account

giving further details. The first two accounts were published by Guéniot see Bibl. Nos. 288 and 289. The third was given by Potocki during the discussion on Lepage's Case (Bibl. No. 474) and he then stated he had assisted Guéniot in the operations. II. 1, said that her father, I. 1, was very small, not more than 1.5 metres in height, that he was aged 74 when she was born, while her mother, I. 2, was aged only 18 or 20. The family was alcoholic. Her mother, I. 2, had subsequently several well-formed children, II. 3, by another husband. These details are given by Potocki, Guéniot's earlier accounts make no mention of them. II. 1, was achondroplastic, Guéniot in his first account calls her a rachitic dwarf. She was aged 19 when she came for her first confinement. Her height was 1.15 metres, she had a prominent forehead and incurved limbs. Caesarean section was performed 17 Dec. 1892, and a girl, III. 1, extracted who weighed 3150 grammes and had the same pathological formation as her mother, II. 1. Her forehead was prominent and her four limbs very short with their upper segments shortened like those of her mother but they were not incurved. The second Caesarean section was performed in 1893 and a boy, III. 2, was extracted who weighed 3000 grammes and was deformed like his mother and sister. The father of these children, II. 2, was tall, strong and well-formed. Potocki in the last account does not give date of the third operation which resulted in a girl, III. 3, who was not achondroplastic, but he states the girl was aged 8, so it must have been 1896. The mother, II. 1, died of peritonitis the fourth day after the last operation. III. 1, had died aged 2½ months of pulmonary congestion, but III. 2, was alive in 1904. III. 3, resembled her father. (Bibl. No. 288, p. 99; No. 289, p. 16; No. 474, p. 277.)

Fig. 614. *Lepage's Case*. II. 11, aged 23 years; married to II. 12, a man of ordinary size and proportions; when first seen was 5 months pregnant. She showed all the signs of achondroplasia, which, amongst other skeletal deformities, had produced a contracted pelvis, on account of which Caesarian section was performed. I. 2, mother of the last, a big, well-proportioned woman, gave the following family history. By I. 1, her first husband, a man of ordinary height and proportions, who died of gastric cancer, she had five births. II. 1 to 5. II. 1, was an abortion at three months and was followed, in the same pregnancy, by a small child at full term, II. 2, now aged 36 years, big and well-proportioned. II. 3, was born at full term, normal, died aged 25 years of "articular rheumatism." II. 5, born after the death of her father, a daughter, normal, died aged 28 months of "cancer of the stomach, ascites, and umbilical hernia." By her second husband, who was below average height, she has had seven pregnancies, II. 6 to 14. II. 6 and 7, were abortions¹. II. 8, was a premature child, born at seven months, "after trauma," female, still living, "very delicate." II. 9, a male child, still living, "suffers from haemoptysis." II. 10 and 11, a twin pregnancy. II. 10, aborted at four months. II. 11, a female was born at full term, achondroplastic. II. 13, a female, and II. 14, a male, were born at full term. All the members of the second family were full sized except II. 11, above referred to as achondroplastic, now aged 23 years. At birth her head was very large, her body small. Head inclined to the side or rear. Breast fed two years. Began to walk at 1 year 8 months. At four years the marked shortening of her legs, when compared with those of children of her own age, was first observed. Scarlet fever in infancy. No other illnesses. Menstruation began at 19 years. She grew somewhat after puberty. Her height is now 1 m. 21 cm. Periods quite regular and in every way normal. After admission to hospital, when five months pregnant, she suffered considerably from dyspnoea. General condition: Rather obese and very muscular. The distal extremities of the fingers extend for 2 to 3 cm. below the great trochanters. The arms, in contrast to the condition in the normal individual, are a little shorter than the forearms. The wrists are somewhat enlarged, but the lower ends of the bones of the forearm are of normal size. The hands, a little enlarged, are of almost normal appearance, but in extension the appearance of a trident as described by P. Marie is shown. The arms are very muscular. There is no abnormal curvature of the upper extremity. Movements normal; pronation and supination complete. Flexion of the elbow greater than normal. Cubitus varus. Arms abducted from the trunk more than normal; this is owing to the great size of the head of the humeri and to the situation of the scapulae. But these are not displaced backwards as has been described in some cases. *Lower extremities*. The lower extremities are short; from great trochanter to sole the measurement is 53 cm. As in the upper extremity the proximal segment is shorter than the mesial (*i.e.* the thigh is shorter than the leg). The thigh measurements from great trochanters to the line of the knee joint, as indicated by marks in crayon on the skin, are: R. 24 cm., L. 25 cm. The legs, measured in a similar way from the line of the knee joint to the external malleolus, show:—R. 24.525 cm., L. 25.526 cm. The feet are of moderate size and length, sole 20 cm., dorsum 12 cm. and fairly broad, 8 cm. Knee joints large. Patellae prominent, with a depression below each. Ankle joint normal. Malleoli somewhat enlarged. Radiographs. Head of humerus enlarged, no surgical neck, but all the upper portion of the shaft is very thick. The part of it covered by the deltoid muscle is very short. The humerus is manifestly shorter than the forearm bones, the radius and ulna. Knees: the tibial surface of articulation of the knee joint is enlarged. The head of the fibula extends into the knee joint and forms part of the articular surface of this joint. The cranium is large. Its diameters are:—A, transverse, (1) biparietal, 16.5 cm., (2) bitemporal, 13.0 cm. B, antero-posterior, (1) occipito-mental, 23 cm., (2) occipito-

¹ Owing to an oversight several of the symbols denoting early death and disease have been omitted from this figure on Plate LI.

frontal 18.5 cm., (3) sub. occ.-fr. 18.0 cm. The frontal and parietal eminences are very prominent. The face is large. The nose, apart from its bridge, which is depressed, is fairly large and prominent; the nostrils are large. The cheek bones are not very prominent. Lower jaw well developed; angle of lower jaw somewhat prominent. Mouth: palate somewhat high-arched, otherwise normal; teeth more or less carious, but normal in number and situation. Ears, normal; lobules fairly large. Neck, rather short. Trunk: thorax normal but rather short. Abdomen somewhat prominent. All the normal curves of the spine very marked. A very slight scoliosis in the mid-dorsal region, convexity to the right. Length of trunk, from episternal notch to upper border of symphysis pubis 46 cm. Pelvis contracted in its antero-posterior diameter. (Measurements given.) All organs normal. Mental condition normal. III. 1, the first child of II. 11, of female sex, delivered by Caesarian section. Resembles its mother in many ways. Head large. Limbs somewhat shortened. Manifest shortening of thigh and arm segments. At birth the head showed exaggeration of the transverse diameters. Frontal and parietal eminences very marked, occipital eminence small. Fontanelles very large; the anterior is prolonged forwards between the two frontal bones; its two lateral angles are prolonged between the frontal and parietal bones of either side; its posterior angle is prolonged for about 1 cm. into the sagittal suture. There is a supplementary parietal fontanelle behind the anterior fontanelle. The posterior fontanelle is not much enlarged. The sagittal suture is not very marked. The mastoid and temporal fontanelles are not palpable. *Upper extremity.* The arm segment is obviously shorter than the forearm. *Measurements.* From acromion process to styloid process of radius: Total, 15 cm.; arm, 6 cm.; forearm, 6.5 cm.; hand, 2.5 cm. Movements normal. No curvature of bones. *Lower extremity.* Shows the same features. *Measurements.* From great trochanter to external malleolus: Total, 16 cm.; thigh, 7.5 cm.; leg, 8.5 cm. Trunk: moderately developed. It measures 18 cm. from episternal notch to the upper border of symphysis pubis. It is larger than that of an infant at term of 3250 grammes' weight. Thorax very broad. Abdomen prominent, enlarged. The spine shows no peculiarities. Face: the nose is large; its bridge is depressed; the nostrils are large. Malar bones prominent. All organs normal. Child well developed. There is no note of any other child of II. 11, nor of descendants, if any, of any of the other children of I. 2, nor of her parents, brethren or collaterals. (Bibl. No. 474, p. 270 and Bibl. No. 494, p. 109.)

Fig. 615. *Launois and Apert's Case.* This case was first described by Launois and Apert in 1905, further additions were made to the pedigree by Apert in 1909. I. 1 and I. 2, were tall and well proportioned, I. 1, died of asthma. There is no note of their parents, brethren or collaterals. They had eight children of whom four, II. 6—9, died young, three, II. 3—5, were healthy and well made. II. 1, aged 34, height 138 cm., had a large round head, maximum circumference 59 cm. The nose was depressed at the bridge with upturned end. Nares large, teeth carious but of normal form and situation. The trunk very muscular showed nothing peculiar in its conformation. The genital organs were well formed. All the limbs were short especially the upper segment (rhizomelic micromelia), and their shortness contrasted with the normal dimensions of the trunk. The man was a typical achondroplastic individual but his hands were not trident-shaped nor were the fingers of equal length. In the upper limb the length from the acromion to the epicondyle was 22 cm., from the epicondyle to the styloid apophysis of the radius 21 cm. and from this point to the tip of the middle finger 15 cm. The lower limbs were also very short, length from the antero-superior iliac spine to the middle of the patella 36 cm. and from the middle of the patella to the ground 35 cm. He was deeply pigmented in the situations where this is usual but large leucotic spots ('vitiligo') showed in the middle of the most pigmented parts, and small brown spots were scattered over the trunk and thighs. There was a supplementary nipple on the left side. The right eye showed traumatic cataract present since infancy. The left eye was normal. There was no sign of hereditary or acquired syphilis. II. 2, his wife, was well formed but showed tuberculous signs which had necessitated amputation of the right leg. They had five children, III. 1—5. III. 1, aged 5 in 1909, was achondroplastic and like her father had large head, bulging forehead and very short limbs. At the age of 26 months in 1905 her height was 70 cm., and maximum circumference of head 52 cm. III. 2, born three weeks before term was small and weak but normally formed; he died a few days after birth of umbilical haemorrhage. III. 3, also normal, died of gastric enteritis aged 4 months. III. 4, aged 14 months, was brought to Apert shortly after birth and appeared normal. But as she grew older, micromelia became pronounced especially in the upper segment of the arms. Her height at 14 months was 65.5 cm., length from the acromion to the epicondyle 8.5 cm., from the epicondyle to the tip of the middle finger 15.5 cm. A table is given contrasting the measurements of this child and of her elder sister when aged 16 months. [The measurements of the elder girl in the 1905 paper are given for age of 26 months, so possibly 16 is a misprint.] This table shows that micromelia existed in the younger but in a less degree. Apert says III. 4 is a case of "achondroplasie atténuée." III. 5, aged 2 months, is merely stated to have been a case of typical achondroplasia. (Bibl. No. 493, p. 606 and Bibl. No. 610, p. 35.)

Fig. 616. *Comby's Case.* III. 2, father, aged 39, healthy, height 1.66 m. III. 3, mother, aged 36, medium height and also healthy. Maternal grandfather, II. 3, very small, squat (trappu) and with very short hands and feet. There is no note of other relatives. Child, IV. 1, a boy aged 5½, born at term, difficult confinement, breast-fed for 12 months, walked at 18 months. Head very large, 53 cm. in

circumference, face large, countenance intelligent. Fontanelle closed. Weight 15,300 grammes. Height 85 cm. Upper arm and forearm 11 cm. Hands large with divergent (*écartés*) fingers. Length from radio-carpal joint to extremity of medius 9 cm. Total length of lower limb from iliac crest to malleolus 32 cm. Leg longer than thigh 15 and 14 cm. Bust long and seemed normal 35 cm. Considerable lumbar curvature with lateral depression of ribs. Abdomen large (57 cm. in circumference at umbilicus). Muscles of body well developed. Genital organs normal. Had adenoids. "We are therefore in the presence of a micromelic dwarf, not at all rickety, having a large head, a normal bust, lively intelligence and flourishing nutrition." (See Bibl. Nos. 408, p. 955 and 409, p. 551.)

Fig. 617. *Lauro's Case*. In 1882—3, II. 1, Anna Piacenza a washerwoman came to be confined to the Obstetrical Clinic in Naples. She was not very intelligent, said she had had an illness when a few months old, but could give no particulars of it, she called it typhus. She had been confined to bed for about three years. She lived in a damp, badly aired house, worked several hours a day and was badly fed. *Measurements*. Total height 121 cm., trunk including head 70 cm., humeri 18 cm., radii 17 cm., hands 14 cm., femora 23 cm., tibiae 20 cm., feet 20 cm., spinal column 61 cm., bi-acromial diameter 31 cm., sterno-dorsal diameter 146 mm. She had a very large head and measurements of it are given. She was operated on, symphysiotomy, hysterostotomy and forceps. A girl, III. 1, was born apparently normal weighed 2400 grammes. It had a large swelling on the right occipito-parietal region. After 24 hours it was sent to the "brefotrofo," where unfortunately it was lost sight of. In 1886—7, II. 1, came for another confinement. The foetus, III. 2, which was of male sex was dead. Superficially it showed no abnormality but when the soft parts were taken from the skeleton, it was evident that it was a true case of intrauterine rachitis. There is no note of any relatives of II. 1. (Bibl. No. 235, p. 386.)

Fig. 618. *Lannois' Case*. I. 4, paternal grandfather of the achondroplastic individuals, is aged 76 years and is still living; a tall man of normal proportions. I. 3, the paternal grandmother, aged 74 years, is still living. She is a very big woman, normally proportioned. I. 2, the maternal grandmother died aged 80 years. I. 1, the maternal grandfather, died aged 63 years. There was nothing peculiar about the size or proportions of these individuals. II. 4, father of the dwarfs, aged 55 years, and II. 3, their mother, aged 54 years, are normal. All their uncles, aunts and cousins are either tall or of medium height. III. 1, aged 31 years is normal; III. 2, aged 30 years is very tall ("un colosse," 192 cm.); III. 3, aged 26 years, is achondroplastic; III. 4, aged 25 years, is achondroplastic; III. 5, aged 14 years, is very big for his age; III. 6, aged 12 years, is big for her age; III. 7, normal, died of convulsions in her third year. III. 3, Thérèse Faug, aged 26 years, height 99 cm., exactly resembles her brother, III. 4, in all respects, except for difference of sex. ("Elle est absolument calquée sur le modèle de son frere.") III. 4, Paul Vincent Faug, aged 25 years, height 111 cm. comes from a village near Bordeaux. Profession, singer at café concerts. Born after a normal labour. Precocious in speech, otherwise normal in infancy, as it was supposed. But at about 5 or 6 years of age it was observed that he did not seem to be developing like the ordinary children but rather like his dwarf sister. His intelligence is good. He is further, a wit. The face is quite symmetrical, the mouth and teeth normally formed. The frontal and parietal eminences are markedly prominent on both sides. The trunk is normal. In the upper extremities the muscles are of normal form but all the bones are shortened; there is no curvature of these bones. The hands are large and show the characteristic trident form (la déformation caractéristique en trident). All the long bones of the hands are shortened, especially the phalanges of the fingers. The skin is thickened, wrinkled and cracked and the subcutaneous tissues are thickened as in myxoedema. "The hands would have made excellent battle-axes." The lower extremities showed the same features as the upper. In general appearance he is somewhat old for his years. The face assumes a jeering expression when he smiles. Hair of the scalp normal. A small growth of hair about the face. Pubic hair abundant. Genital organs normal. Voice normal. Thyroid gland easily felt. All organs normal. Intelligent. (Bibl. No. 414, p. 893.)

Fig. 619. *Houston Porter's Case*. I. 1, is described by his eldest son and two grandsons as having exactly resembled II. 1. I. 2, was of ordinary size. II. 1, aged 80 years, had worked as a bargeman on the River Thames until 70 years of age. Gait "rolling" or "waddling." Micromelia of rhizomelic type. Curvature of all the long bones of the extremities; epiphyses thickened and nodular. Feet short, broad and square. Hands "en trident." Palms of hands reach to great trochanters. (Thus the arms were longer than is usual in achondroplasia, but shorter than normal.) Pelvis small. Sternum curved, gladiolus convex forwards. The typical features of the achondroplastic skull were present but were not very marked. Bosses prominent. Upper part of face large, lower part small. Face thus roughly triangular with vertex of triangle placed below, as is usual in achondroplasia, but bridge of nose not depressed or broadened and tip not upturned. Very little lordosis. Intelligence normal. He had one brother, II. 3, just like himself, but no sisters. II. 2, wife of II. 1, was of ordinary stature. III. 1 and 2, sons of II. 1 and 2, both over 50 years of age, showed the same features as II. 1. The father and these two brothers say that their brother, III. 3, who was drowned, was just like themselves. There were no sisters in this generation. The three living members of this family were all about the same height, 4' 4". Thus in three generations

¹ Original gives these measurements as 18, 17, 14 etc. mm., which must be a misprint.

² "Ospizio de allevare bambini" = orphanage.

there were six achondroplastic individuals, all males. There were no daughters in generation II. or III. "The nature of the condition seems certain, though it is not quite typical, in the following points:—the shape of the bridge of the nose, the length of the arms, the absence of lordosis, and the limbs are not so massive as usual." (Bibl. No. 532, p. 12.)

Fig. 620. *Boeckh's Case*. The account of this family was given to Boeckh by V. 6, whom he calls K. She stated that her great-great-grandfather, I. 1, was a dwarf, that her great-grandparents and grandparents, II. 1 and II. 2, III. 1 and III. 2, were normal. Of the five children of III. 1 and III. 2, one, IV. 5, was a dwarf, he was rather stout with disproportionately large head and much curved short limbs. He died aged 47 of "Herzschlag." From his marriage with a normal sized woman, IV. 6, eleven children were born, four died soon after birth (in his pedigree Boeckh only puts 4 to three), five grew to normal size whilst two, V. 6 and V. 4, remained very small in consequence of rachitis. Boeckh says he saw V. 4, that she had a typical rickety skeleton but the curvatures were less than in the case of V. 6. Her genitals were normally developed. Her husband, V. 5, was "ein echter Zwerg von proportionirten Körperbau, sein Membrum war relativ gross, die Testikel lagen in den Leistencanalen. Seine Frau behauptete dass in der einjährigen Ehe eine vollständige immissio penis nie vorgekommen sei." Another normal sister, V. 2, was married to a big man, she had four children, VI. 1—4, of whom one a 10 year old girl, VI. 4, whom Boeckh saw was extremely small and suffered from typical rachitis. V. 6, according to her relatives, was of normal size at first and showed no abnormality. She grew up in a Pomeranian village. As her parents travelled about to earn their bread by exhibition, she and her brothers and sisters were left with their grandparents and according to V. 6, were badly fed. V. 6, began to walk first in her third year, from which time a gradual increasing curvature of the extremities with retardation of growth developed. The curvature increased continuously whilst the general growth was noticeably retarded. At school she made rapid progress. She menstruated at 19. She had lordosis of the upper lumbar and lower dorsal spine with compensating kyphosis of the upper dorsal spine. The muscles of the extremities were remarkably soft. The hands and feet were short and broad. The epiphyses were enlarged. Her measurements were:—total height 97 cm. Length of arm from the acromion to the tip of the middle finger 36 cm.; from the acromion to the olecranon 18 cm.; from the olecranon to the styloid process of the radius 12 cm. Length of hand from the styloid process of the radius to the tip of the middle finger 12 cm. Total length from the iliac crest to the ground 43 cm.; from the antero-superior spine to the lower edge of the patella, 17.5 cm.; from the lower edge of the patella to the "Hautfurche am Sprunggelenke" 15 cm. Length of the foot from the heel to the tip of the second toe 11 cm. She became pregnant by a normal young man, and a miscarriage was brought on. The child, VI. 5, was a female of normal structure and build who weighed 345 grammes and was 27 cm. in length. Boeckh gives the pedigree as reproduced. (Bibl. No. 280, p. 347.)

Fig. 621. *Baldwin's Case*. II. 1, Mrs J. F. W., aged 24 years. Height 3' 11½". Weight 7 stone 2 pounds. She is described by Baldwin as "a typically rachitic dwarf." She is, however, undoubtedly achondroplastic and as such has been regarded by Porak, Cestan and others. Her photograph is shown by Baldwin. It shows a woman with a large, square head, prominent frontal and parietal bosses and nose with depressed bridge. The lower part of the face is small in comparison with the upper and the face is thus roughly triangular in shape with the vertex downwards. The limbs are markedly shortened in proportion to the length of the trunk and size of the head. The tips of the fingers in extension do not extend quite as far as the great trochanters. The mid-point between the vertex and the soles of the feet would obviously fall above the umbilicus. This shortening affects the proximal segments (thigh and arm) more than the mesial segments (leg and forearm). The limbs are all very massive. They all show curvatures and these, at least where they affect the lower limbs, involve the sites of junction of the epiphyses with the shafts of the long bones rather than the shafts themselves (as would be the case in rickets). The hands and feet are short, broad and thick, but no more than this can be seen from the photograph. The shape of the fingers is not to be observed. All the normal skin folds are exaggerated. There is a dark line, as of the scar of an old cicatrix, in the middle line of the abdomen, extending from just above the symphysis pubis to above the mid-point between this and the umbilicus. This might well be the scar of an operation of abdominal section, such as Caesarian section. There can be no doubt that the case is one of achondroplasia, as shown by:—micromelia (or shortening of all limbs) of rhizomelic type, associated with a trunk of medium size and a head and face of the characters above described, with curvature of limbs of the peculiar kind described, exaggeration of all the normal skin folds, massiveness of limbs and peculiarly short thick hands and feet. These features are much more than enough to show that the case is one of achondroplasia and not one of rickets. III. 1, a female child of II. 1, delivered by Porro-Caesarian section, it was "of full size but with the peculiar deformity of the mother." It lived nine months and died of Angina Ludovici. There is no note of any other children. There is no note of II. 2, nor of the parents of II. 1, nor of her brethren or their descendants, if any. (Bibl. No. 254, p. 138.)

Fig. 622. *Decroly's Case*. Ch. B. aged 28 years, III. 4, is a shoemaker, but he is unable to support his family and receives private charity. His father, II. 2, was small like himself, he says not more than 1 m. 0.5 cm. A photograph showing this individual at the age of 30 years standing near a table is to

hand and his height did not exceed that of his son in the same position. He had four sisters and two brothers, II. 1, 4, to 8; he was the second of the family and married at 32 years. He died at 41 years of age, of pleurisy. The mother, II. 3, is of normal height and still lives; she is 66 years of age. III. 4, had a brother and two sisters; the brother, III. 1, is of normal height; he is crippled by an accident (fracture of the leg). One of his sisters, the elder, was small like himself, but she died at the age of 7½ years, of bronchitis. The other is of normal height and shows no anomaly. He is the youngest of the family; his mother was 38 years of age at his birth. At the birth of III. 4, the large size of his head was remarked. He has had two accidents, one to the head from a fall upon the forehead and the other to the right knee, which was dislocated and is functionally imperfect as a result. In consequence of this infirmity he uses a crutch and his capacity as craftsman is thus reduced. Went to school at the age of 9 years and remained for 2 years; did fairly well. Apprenticed to a shoemaker at the age of 11 years but on account of his feeble physique was unable to do sufficient work to satisfy his employers. Height 110.5 cms., weight 36 kgs. Maximum circumference of head 58 cms. Antero-posterior diameter 196 mm. Transverse diameter maximum 159 mm.; length of R. arm (acromion to epicondyle) 150 mm.; radius 140 mm.; hand (from distal skinfold of wrist to extremity of middle finger) 125 mm.; R. thigh 255 mm.; R. leg (from internal condyle to extremity of malleolus) 175 mm.; R. foot (from heel to extremity of great toe) 170 mm.; trunk (from episternal notch to pubis) 485 mm. The hands are squat, the fingers of nearly equal length; the hands are "in form of a trident." The thighs are markedly abducted, the pelvis tilted forwards. The arms are abducted and the forearms are held in a position of partial flexion. The epiphyses are much enlarged, particularly those of the wrists and digits; there is, further, marked laxity of ligaments. He can easily place the whole hand on the flexion surface of the forearm. The musculature is greatly developed, the muscles are prominent and short. The face is somewhat bony but shows nothing peculiar, neither relative smallness or exaggeration of the volume of the head nor depression of the bridge of the nose. Sexual development normal. Intelligence seems to be well up to the average. As regards his social capacity this is diminished by the above physical infirmities. He married, at the age of 20 years, a normal person of his own age, and has had three children by that marriage, IV. 1, 2 and 3. The eldest, IV. 1, a boy aged 6 years and 4 months, shows the same anomalies as his father, there are two little girls, aged 4 years and 18 months, normally formed. The boy attends the village school and is regarded by his master as of average intelligence for his age; but he has to be placed in a special class on account of his physical condition. The labour was a very difficult one and delivery was effected by forceps. His peculiarity was noted by his father at birth, *i.e.* the head was relatively large and the limbs short. He now has the appearance of a dwarf with the physiognomy and body of an infant of his age. Height 815 mm.; weight 13 kgs. (Photograph shown in memoir.) It is that of an achondroplastic child typical in all respects except that he has marked genu valgum ("knock knee"). Tables of measurements follow but it is unnecessary to give them all. As in the father he can place the whole hand on the front of the forearm, thus showing marked laxity of ligaments. Both these cases are undoubtedly achondroplastic. (Bibl. No. 515, p. 19.)

Fig. 623. *Peloquin's Case*. IV. 1, Pierre P., aged 30 years. Tailor. Height 121 cm. The eldest of three children; breast-fed; began to walk at 18 months of age. His small height was remarked in his early years but he was well formed. His childhood passed without incident. His intelligence developed like that of other children. He learned to read and write at 6 years of age. In spite of his small height his head and trunk are those of an ordinary man. The face, with an abundant growth of hair, is intelligent and without stigmata of any kind. He answers questions well and gives the impression of a man of much intelligence for his social station. Head: Round and globular, of brachycephalic type; without exaggeration of the frontal and parietal eminences. The nose is somewhat depressed and broadened at its bridge. Upper extremities very short; the distal extremities of the fingers only extend a few centimetres beyond the great trochanters. On palpation the bones are very thick but not deformed. The hands are small, the digits of different lengths; there is no deformity "en trident." Musculature powerful he can easily carry a weight of 15 kgs. with one arm. *Measurements*:—Upper extremity: Total, 50 cm.; arm 17 cm.; forearm 19 cm.; hand 14 cm. Lower extremity, very short, very muscular; a curvature of the tibiae with very pronounced internal concavity. Lower extremity: Total length, 54 cm.; thigh 28 cm.; leg 27 cm.; foot 21 cm. The trunk is that of a man of medium size; the distance between the episternal notch and the upper border of the symphysis pubis is 54 cm. All the organs are normal. He is a healthy man, quick in his movements, a good workman and a good walker. IV. 2, sister of this man, aged 27 years. Her height is 118 cm. Breast-fed until age of 12 months. No peculiarity was noted in her early infancy. She began to walk at the age of 13 months. Menstruation began in her 15th year. Chlorosis 17th to 20th years. Very intelligent. Has a very fine memory; "is of a gay and happy temperament well contented with her lot." On first observation one is struck by the disproportion shown between the size of her head and the shortness of her limbs. Her head is brachycephalic, like that of her brother. It is the head of an ordinary medium sized woman of her age. The limbs are very short, especially the lower extremities. *Measurements*:—Upper extremity: Total, 44 cm.; arm 15 cm.; forearm 16 cm.; hand 13 cm. Lower extremity: Total (from great trochanter to sole), 47 cm.; thigh 23 cm.; leg 24 cm.; foot 18 cm. Trunk, from episternal notch to upper border of symphysis pubis, 52 cm. The hand "en trident" can hardly be made out. She

is strong, muscular and in excellent health. Weight 43 kgs. Organs normal. She is unmarried "but it must be said with insistence that this is not from lack of opportunity, but solely from motives of convenience." IV. 3, sister of these, aged 25 years. Normal. Height 1.65 m. Health perfect. Breast-fed. III. 2, aged 48 years, the mother of these children is normally proportioned. Her height is 140 cm. She says that her husband, III. 1, who died aged 52 years "of some gastric trouble," and his father, II. 1, were both very short and of about the same height, 135 cm. approximately. In both the body was long, the lumbar curve marked. The head was of ordinary size. They had short arms and legs. IV. 1, corroborates these statements. There is no note of II. 2, or any other relatives, antecedent or collateral. This case was described by Peloquin and also by Poncet and Leriche. Peloquin did not give the measurements of IV. 2, who, he says, refused to be examined. (Bibl. No. 417, p. 28, Bibl. No. 442, p. 174, and Bibl. No. 443, p. 202.)

Fig. 624. *Litchfield's Case*. There is a general description of the chief characteristics of achondroplasia given but no particular description of any individual in the pedigree except III. 1. Litchfield did not see the mother, II. 3, who had been delivered by Caesarian section and had died shortly afterwards. He only gives a photograph of her and her husband and states that the photograph shows she was a typical achondroplastic dwarf. A photograph of III. 1, is given and it is stated he was achondroplastic, that his ribs were not beaded but that distinct Harrison's sulcus and a slight kyphotic curve of the dorso-lumbar spine pointed to superimposed rickets. At the age of 1 year 11 months he showed the following features. Short bowed legs, very thick and pudding like, epiphyses enlarged, skin folds exaggerated, subcutaneous tissues increased. Arms shortened; tips of fingers do not extend beyond great trochanters. Hands short and broad. Fingers stumpy, "main en trident." Feet short and broad. Head large, bridge of nose broad and depressed. Intelligence normal. "He also showed signs of rickets." Photographs of these three individuals are shown in the above paper. (Bibl. No. 533, p. 624.)

Fig. 625. *Herrgott's Case*. II. 6, Ernest K—, aged 53 years, of height 160 cm. Head large, as big as that of a normal adult of his age. The line of the nose continues directly, in profile, that of the forehead; it is slightly depressed. Teeth regular and normal; palatine vault shows no peculiarities. Neck rather short; thyroid gland clearly palpable. Clavicles normal. Thorax measures 20 cm. from episternal notch to xiphoid cartilage. Vertebral column straight. Hands short, broad and thick and roughly square; they are hairy. The fingers, especially those of the right hand, look as though they had been equalised by a blow of a hatchet; they are as thick as those of an ordinary adult of the same age, but are extremely short; the middle and ring fingers of the right hand are of equal length and measure 4 cm. from the margin of the interdigital fold; on the left the middle is clearly shorter than the ring finger. The little finger and the index are of equal length; they measure a little more than 3 cm. The "main en trident" is well shown. Micromelia very marked, upper and lower limbs being very short. Forearm from line of extension of wrist to olecranon measures no more than 14 cm. and the arm, from acromion to olecranon, measures 17.5 cm. The upper extremities are very muscular and show little limitation of movement. He states that he is one of a numerous family in which there are several dwarfs. His father, I. 1, was a dwarf who died in old age having had, by several females of normal height, numerous children. I. 3, a maternal aunt of II. 6, was also a dwarf like himself; she had become pregnant twice, II. 8 and 9; in the first confinement embryotomy of the infant was performed and the mother was saved; incontinence of urine followed this confinement; in the second confinement she died. II. 2, one of the brothers of II. 6, much older than himself was a dwarf considerably smaller than himself. This brother married and had numerous children, mostly dwarfs, both boys and girls: the latter all died in childhood. II. 4, one of the sisters of II. 6, was also a dwarf. She married a man of normal height and became pregnant but died during confinement at the age of 22 years. She had been operated upon, he states, by "the doctor of the Empress" and her skeleton is conserved in the museum of one of the hospitals of Paris, probably the Tarnier Clinique. Ernest K—, II. 6, is intelligent; he can read and write, he follows the profession of pedlar, leads a wandering life in a caravan, playing comedy and music; he is the originator and director of a troupe formed, in part, by members of his own family. He married, at the age of 19 years, a big and strong woman of 21 years, who died at the age of 42 years, having presented her husband with twelve children and three abortions. Of the twelve children four are dead: twins, III. 5—6, the one aged five days the other aged five months; a daughter, III. 7, of three years and another, III. 8, of five years both of whom seem to have been normal. Eight children are alive, of whom five are of normal development and three (daughters) are achondroplastic like their father. Their ages are 23, 21 and 19 years respectively; they follow three children of normal height, aged 27, 26 and 25 years respectively, and are followed by two others, also well formed, who are in their 17th and 15th years. III. 12, Marie Louise, aged 23 years, had been breast-fed for two years. Menstruation began at the age of 17 years and had been quite regular. Age of commencing to walk uncertain, but it seems to have been between 3½ years and 4 years. At 15 years of age her height was no more than 50 cm. Since the age of 19 years her growth seems to have completely ceased. Her height is now 95 cm. There is a slight dorsal kyphosis which adds to the oddness of her appearance. The head, relatively to her age and not to her height, is normal. The vault of the palate is regular; the teeth are regular, the thyroid gland is very

slightly developed, the clavicles are well formed. The hands are short, the fingers short and broad; in the left hand the medius is the longest but in the right the ring finger is longer than the middle. The "main en trident" is typically present in the left hand but not in the right. The forearm measures 11 cm. from the extremity of the olecranon to that of the styloid process of the ulna and the arm 18 cm. from olecranon to acromion. The epiphyses are large and the diaphyses are very slightly incurved. This woman, as well as her father and two achondroplastic sisters, has a peculiar gait. As she walks she holds the arm slightly abducted from the trunk and, in walking, carries to the front alternately all the side of the body corresponding to the leg advanced to the front. Marie Louise is very intelligent, reads, writes and calculates well. In the troupe which her father directs she is an actress, singer and musician (violinist). III. 13, Lucie K—, aged 21 years, height 110 cm. Head of normal size, in disproportion to her small height. Upper limbs very short, wrists and elbows large. Humerus seems slightly incurved. Arm (from acromion process to extremity of olecranon) measures 13 cm.; forearm is about the same length, the distance from the extremity of olecranon to styloid process of ulna is 13.5 cm. Hands short and show the disposition "en trident" very markedly. The ring finger and not the medius is the longest. Movements of extension as well as of supination are limited. Complete adduction of the arm to the thorax is impossible and the obstacle seems to be the great size of the humeral head relatively to the articular cavity. The lower extremities, as well as the upper, are of remarkable shortness. (A complete description of this individual, with three photographs, is given, she is a typical achondroplastic female with a scar of what was probably an operation for Caesarian section in the supra-pubic region. It does not seem necessary to give this description here in full.) There was no history of syphilis or other infection. She began to menstruate at the age of 15 years. She had had a miscarriage in the second month, 11 months before attending hospital, when again pregnant in the eighth month. Caesarian section performed and a male child, IV. 2, delivered. Normal like its father, a member of the troupe. Aborted once more, and then again underwent Caesarian section, a female child, of normal proportions, IV. 4, being born. III. 15, Leontine K—, aged 19 years. Breast-fed like her sisters; like them ignorant of the age at which she began to walk. Has menstruated regularly since the age of 15 years. Height 106 cm. The head is of the size of that of a normal person of her age. Thyroid gland easily felt. Hands short and the fingers, like those of her father, of nearly equal length. The wrists show marked enlargement. Complete extension of the elbow is impossible. The measurement from the styloid process of ulna to extremity of olecranon is 13 cm.; that between olecranon and acromion is 18 cm. Her intelligence is normal and like her two sisters she is a member of the troupe of which her father is the director. (See Bibl. No. 516, p. 8.)

PLATE LII. Fig. 626. *Balme and Reid's Case*. I. 1, and I. 2, were healthy. Of their children, II. 1, died aged 6 of convulsions. II. 2, died aged 2 of convulsions. II. 3, was alive and healthy. II. 4, died aged 4 of diphtheria. II. 5, and II. 6, were both alive and healthy. II. 7, aged 20 was in good health. II. 8, died aged 4 of measles and bronchitis. II. 9, was a miscarriage in the third month (three years after the eighth child). II. 10, aged 12, was born when his mother was 44; three years after the miscarriage, II. 9. The mother stated that throughout the whole length of time while she was pregnant with the patient, II. 10, she "menstruated" regularly every month; also that during the period she was subject to several "shocks." The confinement was a difficult one, owing to the large size of the child's head and the fact that it was a breech presentation. No instruments were employed but artificial respiration had to be resorted to, as the child was in a state of partial asphyxia. As soon as the child was born he was noticed to have a large head and very tiny arms and legs. Up to the age of 15 months the child was solely breast-fed and appears to have been quite healthy, though he is said to have had a fit when 9 months old. Dentition occurred at the ordinary time, but the mother did not allow the child to attempt to walk, until he was $1\frac{1}{2}$ years old as "he was so fat." He then made rapid progress and had always been particularly strong, never suffering from any of the ordinary children's ailments with the exception of measles. He had always been very bright mentally. At age of 12, his height was only $38\frac{3}{4}$ "; his head was abnormally large and square measuring $23\frac{3}{4}$ " in circumference but was free from bosses or other signs of disturbed growth. The bridge of the nose was very depressed and the mouth was usually kept open. (The child had adenoids in abundance.) The arch of the palate was distinctly high, the thorax was well developed and measured 24" after deep expiration. The clavicles were normal in length though rather more curved than usual, the scapulae and sternum also appeared normal, and there was marked beading of the ribs. The vertebral column measured $20\frac{3}{4}$ " from the occipital protuberance to the top of the coccyx and there was well marked lordosis. The thyroid body was palpable and there were no supra-clavicular pads. The arms were very short, so that the fingers only just reached the bottom of the great trochanter when the boy was standing upright. The humeri were short, thick and slightly curved and the elbow joints could not be extended beyond an angle of about 160° . The hands were small and fat and the fingers all of the same length, they showed very clearly the characteristic separation between the middle and ring fingers. The femora were short and thick, the lower epiphyses appearing relatively broad and massive. There was marked lateral curvature of the left tibia and fibula, but the corresponding bones on the right side were quite straight. The feet were somewhat deformed, the middle toe of the left foot being curiously deflected laterally so as to lie over the second toe:—*Measurements*. (Those in brackets

are measurements of normal boy of same age.) Stature $38\frac{3}{4}$ " ($55\frac{1}{4}$ "). Height when sitting 26" . Crown of head to umbilicus 20" ($27\frac{1}{2}$ "). Umbilicus to sole of foot $18\frac{1}{2}$ " ($32\frac{3}{4}$ "). Suprasternal notch to symphysis pubis $16\frac{1}{2}$ " ($15\frac{3}{4}$ "). Occip. protuberance to tip of coccyx $20\frac{3}{4}$ " ($24\frac{1}{2}$ "). Circumference of head $23\frac{3}{4}$ " ($20\frac{3}{4}$ "). Tip of mastoid to tip of mastoid (across vertex) $16\frac{3}{4}$ " ($15\frac{1}{4}$ "). Clavicle $5\frac{1}{8}$ " ($5\frac{1}{8}$ "). Humerus (acromion to external condyle) $5\frac{1}{2}$ " ($10\frac{1}{4}$ "). Radius 5" ($7\frac{1}{4}$ "). Ulna $5\frac{1}{4}$ " (8"). Wrist joint to tip of middle finger $5\frac{1}{4}$ " ($5\frac{3}{4}$ "). Circumference of hand $5\frac{3}{4}$ " (7"). Thumb $1\frac{5}{8}$ " (2"). First finger $1\frac{5}{8}$ " ($2\frac{5}{8}$ "). Second finger $1\frac{5}{8}$ " ($2\frac{7}{8}$ "). Third finger $1\frac{5}{8}$ " ($2\frac{3}{4}$ "). Fourth finger $1\frac{5}{8}$ " ($1\frac{3}{4}$ "). Circumference of upper end of humerus $8\frac{1}{2}$ " (10"); around crest of pelvis 21" ($22\frac{1}{4}$ "). Ant. sup. spine to knee joint $7\frac{5}{8}$ " (16"); ant. sup. spine to int. malleolus $15\frac{1}{2}$ " ($28\frac{1}{4}$ "). Great trochanter to sole $18\frac{1}{2}$ " ($29\frac{3}{4}$ "). Femur (great trochanter to ext. condyle) $8\frac{1}{4}$ " ($13\frac{3}{4}$ "). Tibia $6\frac{3}{4}$ " ($11\frac{3}{4}$ "). Fibula $7\frac{1}{4}$ " ($12\frac{3}{4}$ "). Length of foot $6\frac{1}{2}$ " ($8\frac{1}{4}$ "). Circumference of lower end of femur 10" ($11\frac{3}{4}$ "). (Bibl. No. 465, p. 780.)

Fig. 627. *Osiander's Case*. I. 2, was an unmarried dwarf, aged about 27 and scarcely 49 "pollices Parisienses" in height. She was healthy, fleshy and obese and except that the femora were curved and the pelvis too much inclined, she was well formed. She menstruated at 18, and menstruation continued (emansit) after conception. There is a long description of the confinement. The child, a girl, was born almost four weeks too soon, her weight was $5\frac{1}{2}$ "librae civiles" and length 17 "pollices." The smaller diameter of the head was 3" 1", the larger diameter of the head was 4" 2", the breadth of the shoulders (latitudo humerorum) 4". The measurements are presumably in French inches and lines. A picture of the dwarf is given, the arms look a little short, the fingers just reaching a little below the top of the thigh and the legs look rather short. (Bibl. No. 51, p. 1.)

Fig. 628. *Scharlan's Case II*. Of I. 1, no statement is made. I. 2, was a strong woman of 36 when II. 6 was born and she had already borne five healthy children, II. 1—5. She had cholera during pregnancy. II. 6 was born a few weeks too soon, it was nearly dead and died. In external appearance it was almost exactly like *Case I*, Fig. 646. When dissected it was found the sutures were patent and the fontanelles large. The spine was of normal length, the clavicles well developed, shoulder blades small and soft. The pelvis was very small. All four extremities were remarkably short and much curved but not fractured. The length of the upper arm was 1" 6", of forearm 1" 7", of thigh 1" 9" and of leg 1" 5". The epiphyses were much enlarged¹. (Bibl. No. 135, p. 412.)

Fig. 629. *Kirchberg's and Marchand's Case*. I. 1, and I. 2, were healthy, no trace of struma, tuberculosis, syphilis or alcoholism in them. II. 1, was the first child. Born dead or died soon after birth. The length of the trunk was 31.5 cm. The head was very large, its circumference being 37 cm. The face was remarkably flat, the nose perfectly flat, the nostrils extremely small and eyes rather protuberant. The hard palate was cleft from the middle posteriorly, the soft palate and uvula were also cleft. The extremities were very short and thick. The length of the upper extremities from the acromion process of the scapula to the tip of the middle finger was 12 cm., that of the lower extremities measured $7\frac{1}{2}$ cm. (internally). The femora and tibiae were curved. The feet very short and the skin of the limbs was in thick folds. The thorax was very short, fairly broad and sunken in the middle line, the sternum extremely flexible and moveable. The abdomen was much distended. Measurement from vertex to umbilicus was 22 cm., from umbilicus to heels $9\frac{1}{2}$ cm. The pelvis was small and narrow. Maximum length of left femur 4.8 cm., of right 4.7 cm. The bones of the legs were very thick. The tibia was 4 cm. in length. The scapula was extremely thick and short, its greatest height being 3 cm. The clavicle was long and narrow $4\frac{1}{2}$ cm. in length. The bones of the upper extremities were short and thick, the radius and ulna being somewhat curved anteriorly. Length of ulna 4.1 cm., of radius 3.3 cm., of humerus 4.4 cm. (Bibl. No. 243, p. 183.)

Fig. 630. *Von Franqué's Case*. No statement is made with regard to I. 1. I. 2, had only learned to walk at 2 years of age, and had been bandy-legged as a child, but she had been always healthy; showed no noticeable rickety symptoms. She had five children, II. 1—5. II. 1, was still-born and its arms and legs were not perfect. II. 2, born a year later lived for $\frac{1}{4}$ year and had club feet. II. 3, born two years after II. 2, was normal, healthy and well-grown. II. 4, born two years after II. 3, had the same curvature and shortening of the extremities as II. 1 and II. 5. II. 5, is the case described by von Franqué. It was born before full term, according to the mother's reckoning within the 30 weeks. It was 34 cm. in length and the circumference of the head was 30.5 cm. It was well nourished, but died² because it was a breech presentation and there were difficulty and delay in delivery of the after-coming head. The defective formation and curvature of the extremities were at once evident. The arms and legs were much shortened. Length of humerus 4 cm. instead of 6.75, and of ulna 2 cm. instead of 5.75. Length from great trochanter to the ext. malleolus 7 cm. The hands and feet were relatively well developed. The expression of the face could not be described as cretinoid, the root of the nose was not specially sunken. The convexity of the curvature was backwards in the humerus and was backwards and towards the middle in the ulna and forwards and outwards in the femur and tibia. In the middle of the latter there was an acute angular curvature, which could be felt through the soft parts. The feet were in the position of equino-varus. An examination of the radius, ulna, humerus and costa showed great hardness and lack of

¹ In Fig. 628, II. 6 and not II. 2 should be marked as dying at birth.

² Not indicated in Fig. 680.

the medullary cavities in the diaphyses but no special thickening of the epiphyses. There was in the ribs a conformation similar to the "rosary" in rickets. (Bibl. No. 278, pp. 80 and 88.)

Fig. 631. *Meynier's Case I.* I. 1, suffered from sciatica (ischialgia). No statement is made with regard to I. 2, except that all the ancestors and collaterals of II. 4, were of medium height. II. 2, also had sciatica. II. 3, had convulsions and a cousin of II. 4 (what degree of cousinship and on which side is not stated) had bronchial asthma. II. 4, was of middle height, he suffered from sciatica and lumbago. Syphilis was absolutely denied. He married II. 5, who was healthy, she had a brother, II. 6, who died aged 2 and who had rickets; of her parents, I. 3 and I. 4, nothing is stated. II. 4 and II. 5, had seven living children and there was a miscarriage of 30 days, III. 7, between the sixth and last child. III. 1, suffered from eczema, otherwise the first six children, III. 1—6, were healthy. They were nursed by their mother from 12 to 15 months and were all of normal stature except III. 6, aged 3, who was of rather less than normal stature. II. 8, was an eight months' child and at birth the parents noticed she had very short legs, her hair was long and very thick and her skull soft. When seen in 1902 she was aged 7 months and 19 days. One was struck by the shortness of the lower limbs, the large head, the size of the anterior fontanelle, the long hair, the skin in folds, the large and fleshy hands and feet, the exaggerated lumbar curvature, the well-formed thorax and surprising intelligence of the baby who even then could say a few words. A second examination was made in 1903 at the age of 10 months. She was then measured. She had whooping cough in May 1903 and died in June. (Symbol of early death omitted in Fig. 631.) As she died in a private house, an autopsy could not be made at once, but the skeleton was obtained five months after and measurements were again taken. Both sets of measurements are given. Only the first measurements are given below. Length from episternal notch to upper border of symphysis pubis 25 cm.; from episternal notch to distal extremity of xiphoid process 9 cm.; from distal extremity of xiphoid process to the umbilicus 8 cm.; from umbilicus to upper border of symphysis pubis 8 cm. The lumbar curvature was very pronounced, the lumbar column projecting straight from the glutei. *Upper limbs.* From the angle of acromion to the distal extremity of the middle finger on the outer side, L. 23 cm., R. 25.5 cm.; length of arm from angle of acromion to olecranon, L. 9 cm., R. 10 cm.; forearm from the olecranon to the styloid process of radius, L. 8 cm., R. 9 cm.; hand from the styloid process of the radius to the extremity of middle finger, L. 6 cm., R. 6½ cm. The fingers were very large with an evident tendency to the "main en trident." The middle and index fingers were of the same length in the right hand, in the left hand the ring and middle fingers were of the same length and the index and little finger of the same length. It was almost a square hand. The greatest circumference was 12 cm. *Lower limbs.* Length from antero-superior iliac spine to external malleolus of ankle joint, L. 23 cm., R. 22 cm. Length of thigh from antero-superior iliac spine to head of fibula, L. 14 cm., R. 13 cm.; leg from head of the fibula to the external malleolus, L. 9 cm., R. 9 cm. Distance from the external malleolus to the sole 3.5 cm. The feet were large and fleshy, with large toes. She was radiographed, and it was seen that the diaphyses in the lower limbs were normally ossified and were especially thick at their extremities; they showed no nodosities or signs of fracture. The curvature in the bones of the legs was more marked than in the femora, but was regular, uniform and symmetrical. The distance between the diaphyses of the femora and those of the bones of the legs was very ample and allowed one to suppose that the epiphyses were much enlarged and completely cartilaginous. (Bibl. No. 466, p. 470.)

Fig. 632. *Hunter's Case.* No note is given of Gen. I. II. 3, was aged 74, alive, she suffered from bronchitis. She had two elder sisters, II. 1, who died aged 58 of Bright's Disease, and II. 2, who died aged 71, also of Bright's Disease. No note is made of any descendants of these sisters. She married II. 6, who died aged 59 of chronic paralysis. II. 6, had an elder sister aged 71 who was in good health. It states she was the second born but mentions no elder brother or sister. A younger brother, II. 7, died, aged 16, of consumption. II. 3 and II. 6, had seven children, III. 1—7. III. 1, aged 49, healthy. III. 2, aged 46, healthy. III. 4, aged 42, healthy. III. 5, died of scarlet fever, aged between 4 and 5. III. 6, died of scarlet fever, aged between 2 and 3 years. III. 7, died aged 19, of consumption. III. 3, aged 44, who was not very intelligent, being described as "rather simple," was hardworking and thoroughly respectable. She married, at the age of 22, III. 11, who was then aged 20. His mother, II. 9, aged 76, suffered from chronic bronchitis, she had an elder sister, II. 8, aged 78 and healthy, a brother, II. 10, died of a stroke aged 68, a sister, II. 11, died of dropsy, aged 35. II. 12, was dead, but there was no information as to cause of death. II. 13, died aged 21, of a "twist in the bowels." No note is made of any descendants of these brothers and sisters. II. 14, father of III. 11, died aged 72 of senile decay, his brother, II. 15, died of pneumonia, aged 66. II. 16, aged 72, II. 17, aged 69, and II. 18, aged 65, were in good health. Nothing is said with regard to their descendants. III. 11, aged 42, said he had a kind of stroke at about age of 2 years but otherwise was healthy. His sister, III. 8, aged 54, and brother, III. 9, aged 49, were in good health. III. 10, died of meningitis aged 19. III. 12, aged 39, and III. 13, aged 35 were healthy. No note is made of any descendants of Gen. III. except the family of III. 3 and III. 11. They had seven children, IV. 1—7. Of these, IV. 1, M. C., aged 21, IV. 7, aged 6½, were in good health. IV. 2, W. C., died aged 1½ years of meningitis. IV. 3, H. C., aged 16, was achondroplastic though unless her photograph was misleading the skull had escaped involvement. She was of average

intelligence with well-developed limbs and mammae, but no pubic hair. IV. 4, A. C., aged 15 (1910), height 4' 5". Weight 64 lbs. He suffered from diabetes for about seven years but seemed to have outgrown it. Had not been medically attended for about eight years. He only looked half his age and his lower limbs were shortened. IV. 5, W. C., aged 13 (1910), was born after long and hard labour, had fits in infancy and a "kind of stroke" when 2 years old. He shows distinct suggestions of achondroplasia and is in an imbecile asylum. IV. 6, M. J. C., aged 9, was very delicate, before she was 5 years old she had both thighs and her collar bone broken. IV. 7, F. C., aged 6, said to be in good health. The case is an interesting one as showing a typical achondroplasia, associated with mental defect, phthisis and defective growth in the same stock. (Unpublished case from Dr D. W. Hunter: see Plate SS (99)—(101), and note resemblance of hands in IV. 3 and IV. 5.)

Fig. 633. *Crimail's Case*. I. 1, died suddenly aged 40. I. 2, was strong and well. II. 1—6, were healthy. II. 7, walked when 13 months old and her development appeared normal except that the thorax developed greatly in proportion to the extremities. The vertebral column showed no curvature or lateral deviation; the limbs were small, but not deformed, being quite straight and without curvatures or trace of rickets. *Measurements*. Total height 1.28 m. Length of arm from the angle of the acromion to the distal extremity of the middle finger 0.51 m.; from the angle of the acromion to the proximal extremity of the olecranon process 0.19 m.; from olecranon to the styloid process of the radius 17.5 cm.; from the styloid process of radius to the distal extremity of the middle finger 14.5 cm.; length from the antero-superior iliac spine to ground 15.5 cm.; from the spina iliaca to head of fibula 28 cm.; from the head of the fibula to the external malleolus 27.5 cm.; from the external malleolus to the ground 4 cm. The pelvis was uniformly narrow (*i.e.* in all dimensions) like that of a non-rickety dwarf. Caesarian section was performed. The child was dead on delivery and no details of it are given (sign for death at birth omitted in Fig. 633). The woman recovered. (Bibl. No. 244, p. 272.)

Fig. 634. *Wood and Hewlett's Case I*. Of I. 1 and I. 2, nothing is stated, they had 16 children, II. 1—16, all well grown except II. 13. II. 1, aged 80, was blinded by an accident when a boy. II. 13, was the 13th child. He was a strong active dwarf in regular employment as a farm labourer. His general health was excellent. He did not waddle as he walked. The general appearance was typical of achondroplasia. He had a large head, long body, short arms and legs and marked lordosis. The bridge of the nose was hollowed, the palate very high arched, the back of the head vertical instead of convex. The extension of the elbow joint was markedly limited by the excessive bony development at the posterior part of the lower end of the humerus. The wrists and fingers were very lax, allowing a much greater range of extension than in the normal hand. The fingers were short, the genitalia well developed. *Measurements*. Abdomen at umbilicus 31". Length of right femur from the trochanter to external condyle $9\frac{1}{2}$ "; foot $8\frac{1}{4}$ "; hand from lowest crease in wrist $5\frac{1}{2}$ ". Circumference of calf $10\frac{1}{2}$ ". Extension of both arms was limited to an angle of 135° . (Bibl. No. 437, p. 17.)

Fig. 635. *Hutchinson's Case*. This is an account of the skeleton of the Norwich dwarf, I. 1, aged 35, height 4' 2". He was executed for the murder of his child, II. 1, and the attempted murder of his wife. His legs and arms were short, the tips of the fingers only just touching the great trochanters. All the larger bones of the limbs were thick and remarkably short but not curved in any way. *Measurements*. From the crown of the head to the top of the breast bone 13". From the top of the breast bone to the extremity of the trunk 19". Length of thigh 8"; leg 8"; upper arm $6\frac{1}{2}$ "; forearm 7"; hand and longest finger $5\frac{1}{2}$ ". Circumference of wrist $6\frac{1}{2}$ "; knee 14"; ankle 8". Breadth of shoulders 4" (?) ; across hips 12". Circumference of skull $23\frac{1}{2}$ "; neck $14\frac{1}{2}$ "; trunk measuring at lower end of breast bone 32". (Bibl. No. 242, p. 229.)

Fig. 636. *Turner's Case*. I. 1 and I. 2, were not related, married at 23 and were both alive and healthy. No history of syphilis was obtainable and no other members of the family had been deformed. II. 1, the eldest child was born within the first year of married life, the following year stillborn twins, II. 2—3. About a year later, II. 4, now well and normally developed; then II. 5, who died aged 12 months of diphtheria, then II. 6, now aged $3\frac{1}{2}$ years, and lastly, II. 7, who died aged 3 months of "consumption of the bowels." The deformities of II. 1, aged 10, were noticed at birth but became more marked as the child developed owing to the increased size of the head and body as compared with the limbs. She had always been very intelligent and was considered much sharper than her sisters. She was unable to attend to herself during the ordinary calls of nature, unable to wash thoroughly and took about three hours to dress. She could write only with great difficulty owing to the deformity of her fingers and hands. She had no serious illnesses. The isthmus of the thyroid gland could be felt but the lateral lobes could not be detected. When sitting there was usually a single kyphotic curve, but on standing there was marked lumbar lordosis. She had slight genu valgum. Even when the arms were completely extended by the sides, the fingers could scarcely reach the iliac crests and could only just touch the umbilicus. The hands were spade-like whilst the fingers tapered to their extremities so that even when outstretched the ends were not in apposition. The index and middle fingers were widely separated from the ring and little fingers. The face was small like that of a cretin with coarse features and very depressed nose.

Measurements. Height standing 37"; sitting 24". Fronto-occipital circumference of head 21½". Acromion to tip of olecranon 5". Olecranon to tip of middle finger 8½"; olecranon to styloid process of ulna 4½". Circumference of wrist 5". Length of clavicles 5". Occipital protuberance to tip of coccyx 16". Antero-superior iliac spine to ground when standing 15½". Great trochanter to external malleolus 12¼". Antero-superior iliac spine to knee joint 7". (Bibl. No. 354, p. 263. Photographs are given.)

Fig. 637. *Variot's Case.* I. 1 and I. 2, were healthy and well made. They had eight children, II. 1—8, of whom the six eldest, II. 1—6, were normal, and II. 8, had died, whether normal or not is not stated. There had been no miscarriage and no reason to suppose syphilis. II. 7, only began to walk at 3, since then her development had been slow but she had no serious illness. Her height was 1.24 m. or 15 cm. below normal. The lower limbs were remarkably short. Length of thigh from great trochanter to the line of articulation of the knee joint 27 cm.; leg from the articular line of the knee to the external malleolus 30 cm.; height of trunk from episternal notch to symphysis pubis 46½ cm. The femora were much shortened, and the internal condyles abnormally developed. There was genu valgum on both sides. The feet were very deformed, short and squat, the plantar arch being almost absent, the metatarsals seemed shortened, the transverse arch of the foot normal. Length of upper arm from acromion to extreme epicondyle 18 cm.; forearm from tip of the olecranon to styloid process of the radius 21 cm. There was no incurving of the bones of the forearm or of the leg. The hands were similarly deformed to the feet and appeared rather square. There was little difference in the length of the fingers which hardly tapered at the extremities. The trunk seemed extremely long and well made, and there was no lumbar curvature. The head was well made and the intelligence well developed. (Bibl. No. 438, p. 268.)

Fig. 638. *Davidson's Case.* Details of this case were sent to Ballantyne by Dr Samuel Davidson. I. 1, was healthy but much addicted to use of alcohol in excess. I. 2, was healthy, she had had seven children, II. 1—7, all but II. 7 were born alive at full term and breast-fed. II. 1, died aged 13 months from "convulsions." II. 2, died aged 1 month from "bowel hives." I. 2, was aged 32, and had been married 15 years at birth of II. 7; there was no hyrannios and the infant died during delivery (not indicated on Plate). It weighed 2160 grammes and was of the female sex. The lower limbs were fixed in an unnatural position; the thighs were sharply abducted and passed outwards almost at right angles to the pelvis, the legs were partly flexed and showed a marked concavity on the inner aspect and the feet were turned sharply inwards. *Measurements of Infant.* Length with lower limbs in position described 38 cm. Distance from finger tip to finger tip with arms extended 32 cm. Occipito-frontal circumference of head 33 cm. Occipito-mental circumference of head 37 cm. Both upper and lower extremities seemed slightly shorter than normal and on both was some deepening of the natural flexures. The head was broader than usual, the nose short and somewhat flattened with a depressed bridge. The thyroid and thymus were normal. (Bibl. No. 405, p. 338.)

Fig. 639. *Osler's Case.* I. 1 and I. 2, were healthy French-Canadians. They had 14 children, II. 1—14, of whom the eldest was aged 27 and the youngest 4. Five children had died in infancy, II. 10—14. With the exception of II. 5—6, the dwarfs, the remaining children were all healthy and well grown. II. 5, aged 16, was 86.5 cm. in height. The mother did not remember anything abnormal about her as a young infant. She walked at 18 months old. Her head seemed large, and the mother said the fontanelle did not close till her sixth year. When between 3 and 4 years of age it was noticed she did not develop naturally and that her joints were very large. She was bright-looking and intelligent but somewhat full and coarse featured. The head measured 56 cm. (presumably the horizontal circumference, but the writer does not say what he is measuring!); the teeth were well formed. She talked fluently and well, had learned to read a little and was beginning to write; but was backward for a girl of her age. The most remarkable phenomenon was the condition of the joints of the long bones. The shafts were short and looked thin and the articulations very short and irregular. The shoulders were not much affected, but the elbow joints, wrist joints, knees and ankles were enormously enlarged. She was a little knock-kneed when she stood. The mobility in the joints was perfect. II. 6, aged 11½, was 87 cm. in height. His mother did not notice anything special about him, except that he was late in walking and the anterior fontanelle did not close till between the third and fourth years. He did not seem to grow much after the fourth year. He resembled his sister. His head was large and well formed, he was very intelligent looking, bright and good-tempered. The articulations were extraordinarily large and contrasted with the smallness and shortness of the shafts of the bones. He was somewhat pigeon-breasted and when he stood, knock-kneed. Osler states there is no doubt these were achondroplastic and not cretins. (Bibl. No. 331, p. 190.)

Fig. 640. *Meckel's Case.* I. 2, and I. 3, were healthy, and no such deformity had occurred in either of their families, although both had been married before. The mother, I. 3, of the children thought that the rough treatment which she had received in her third confinement with a normal child was the only cause as far as she knew why the first three children, II. 2—4, were normally formed, and the last three, II. 5—7, were deformed. But the fact that during her pregnancy with II. 6, she fell down the stairs twice, and during her pregnancy with II. 7, fell once, might have had something to do with it. Meckel only examined II. 7, a female foetus (not indicated as stillborn on Plate). The skull was very large in proportion to the face and was very high relative to its diameters. The bones of the skull were

remarkably thin, small, and broken in many places. The bones of the face were also broken. The fractures were fresh and had probably occurred during birth. The epiphyses showed hardly any traces of ossification. The clavicles were much curved, thick, and defectively ossified for age. Some of the arm bones were fractured. The bones of the hand, especially the fingers, were abnormally short, thick and broad. The femora were much curved. The fibulae were abnormally thick and broad. The knees were everted, the legs and feet inverted. The limbs were abnormally short and thick. The weight was 4 lbs. ("4 Pfund Medicinalgewicht"). There were 43 fractures in the ribs. The nose was flat. *Measurements.* Length from vertex to sole of foot 9" 6" (seems inconsistent with measurements below); vertex to buttocks 8" 9"; of head from vertex to chin 3" 4". Breadth of head between parietal eminences 2" 9". Length of neck 0; trunk 5" 5". Maximum circumference of the trunk at the upper part of the abdomen 8" 3". Length of the upper extremities 3" 9"; hands 1" 3"; carpus and metacarpus 10"; fingers 5". Maximum circumference of the upper limbs 4" 6". Breadth of the hand 1" 1". Circumference of finger 10". Total length of lower extremity 3" 10"; of foot 1" 8". Breadth of foot 1". Length of toes 6". Circumference of toes, with the exception of the great toe which was twice as thick as the normal, 9". From the general account of this case, it seems probable that it was one of achondroplasia: the multiple fractures suggest rickets or rickety pseudo-achondroplasia. The distinction had not been made at that day, and most of the measurements give little help; no statement is made of the amount of force used in delivery, and the fractures may have been due to this. (Bibl. No. 69, pp. 45 and 9.)

Fig. 641. *Wood and Hewlett's Case II.* No statement is made with regard to I. 1. I. 2, said she was worried and had received a shock in the fifth month of her pregnancy with II. 3. Her two elder children, II. 1—2, were normally developed. At birth of II. 3, the labour was difficult and forceps were used. The nurse noticed that his arms and legs were very short. At 12 months old he was unable to hold his head up and his back was very much curved. Massage improved the condition of his neck muscles. He walked for the first time at 2 years of age. His nasal breathing was obstructed at birth. When seen at age of 7, he was an achondroplastic dwarf, 3' 1" high, and weighing 2 stone 10½ lbs. He was a bright, active boy, who went to school, and could read small words and write his own name. He could bend down and kiss his toes without bending his knees. The circumference of his head was 22½", the forehead was overhanging, the bridge of the nose very depressed, the palate very highly arched. The short ribs with normal sternum and normal spine produced deformity of the chest. Extension at the elbow could not occur beyond an angle of 135°, on account of the large bosses at the ends of bones. The hands were spade-like, the fingers tapering to the extremities and spread out like the ribs of an open fan. The wrists and fingers were very supple. There was marked lordosis of the back both in the erect and recumbent position. The lower limbs measured 13" from the antero-superior spines to the inner malleoli. The femora were straight. The hair was fine and inclined to be curly, with well-marked "cow-lick" in the frontal region. *Measurements.* R. arm: acromion to external epicondyle of humerus 4¾"; greatest length of ulna 4¾"; length of hand from styloid process of radius 3¾". Thorax: at nipple line 20"; in furrow below nipple line 19¼". Back from seventh cervical spinous process to tip of coccyx 15¼". Waist at level of umbilicus 18½". Lower extremity: R. femur from trochanter to external condyle 7¼"; R. fibula 5¾"; length of foot 5½". Greatest circumference of upper arm 7"; calf 7½". Distance between inner angle of eyelids 1¼". The boy was under observation for nine months and increased 1" in height and 2½ lbs. in weight. (Bibl. No. 420, p. 90.)

Fig. 642. *Wood and Hewlett's Case III.* I. 1, died aged 48 of cerebral palsy. Nothing is stated with regard to I. 2. I. 1, and I. 2, had seven children, II. 1—7. II. 6, died aged 4 months. II. 7, died at birth. II. 3, aged 8¾, was the third of the five survivors. He crawled till he was 4 years old, but since then had walked. He went to the State School, knew his letters, could spell a few words and count. The bridge of the nose was depressed, the palate high-arched, the forehead overhanging. He had had necrosis of the left upper maxilla with scarring and contraction of the lower eyelid. The toes were well formed, the fingers thickened, tapering to a point and diverging as in other cases. There was a well-marked thyroid present. There was marked lordosis when standing or lying down. The head and waist were very small, the abdomen and buttocks very prominent. He walked without a waddle. He was unable to extend the elbows beyond 135°. The fingers extended two inches below the crest of the ilium with arms hanging by sides. The mother said he had grown one inch in three years. *Measurements.* Weight 2 st. 10 lbs. 13 ozs. Height 3'. Circumference of head 22½". From tip of acromion process to external epicondyle of humerus (R. arm) 5". From tip of olecranon to tip of extended mid-finger 8¾". Circumference of chest below nipple line 21"; abdomen at umbilicus 20¾". From antero-superior spine to tip of internal malleolus (R. and L.) 12¾". Umbilicus from ground in erect position 18". From vertebra prominens to tip of coccyx 14". Greatest circumference of the upper arm 6"; forearm 6½"; thigh 11"; calf 8½". Circumference of chest high up in axilla 21½"; buttocks below crest of ilium 21". Transverse diameter of chest 9"; buttocks 7½". (Bibl. No. 420, p. 392.)

Fig. 643. *Wood and Hewlett's Case IV.* Of I. 1, and I. 2, nothing is stated except that no history of any similar dwarfing existed on either side of the family. They had five children, II. 1—5, all of whom were well developed except II. 5, the youngest, aged 11. She was said to have been hydrocephalic at

9 months old; she walked at 18 months and began to talk at same time. She had had otorrhoea and had always been a restless sleeper. She was a bright achondroplastic dwarf, with large head and extremely depressed nasal bridge, the end of the nose was markedly retrousse. She went to the State School, and could write an excellent essay. She could kick her forehead when sitting down, and bend down to kiss her toes. There was marked lumbo-sacral lordosis when standing or lying. The extension of the elbows was limited to 135° . The fingers were thick, conical and diverged from the mid-line. *Measurements.* Weight 3 st. $11\frac{1}{2}$ lbs. Height $3' 6\frac{1}{2}"$. Distance between inner angles of eyes $1\frac{1}{2}"$. R. humerus from acromion to lower part of external epicondyle $6\frac{1}{4}"$. R. ulna, greatest length $5\frac{1}{2}"$. Circumference at nipple line $22"$. Spine from vertebra prominens to tip of coccyx $17"$. Waist at umbilicus $19\frac{1}{4}"$. R. femur from trochanter to external condyle $8\frac{1}{2}"$. L. fibula $7\frac{3}{4}"$. Length of foot $6\frac{3}{4}"$; hand $4\frac{1}{2}"$. Circumference of calf $9\frac{1}{2}"$. The fingers extended $3"$ below the crest of the ilium as the arms hung by the sides. (Bibl. No. 420, p. 393.)

Fig. 644. *Miller's Case.* I. 1, and I. 2, were well formed and healthy, there was no history of alcoholism, syphilis, or any other disease or malformation in either them or their progenitors. They had five children, II. 1—5, of whom four, II. 1—2 and II. 4—5, were healthy. II. 3, aged 7 years, was the third son. Instruments were used at his birth owing to his large head, but there was no special difficulty. The abnormal size of the head and the short limbs were noticed at birth. He was breast-fed till the 12th month and was a healthy baby though fatter than the other children of the family. He walked at 18 months. Dentition was normal, he had twenty sound teeth, of which eighteen were milk and two permanent teeth (lower incisors). He never had any illness save chicken-pox and measles, and was especially strong, well and active. The head was large, especially the cranial vault, the nasal bridge depressed (but less so than is usual in achondroplasia), the forehead prominent, the palate not arched. The trunk was normal, the thorax somewhat depressed laterally and the ribs slightly beaded. The clavicles were normal; there was marked lordosis and the buttocks were very prominent. The arms were very short, the finger tips not extending to the great trochanter. The humeri, ulnae and radii were all short, thickened and curved, the two latter more than the former. The elbow joints could not be fully extended (150° to 160°). The hands were very characteristic, being short, thick, and flat with digits of almost equal length, the middle and ring fingers tending to separate from one another in extension, constituting the "main en trident" of Marie. The legs were short and thick, the femora especially so, while the tibiae and fibulae were curved laterally, particularly on the right side. The gait was somewhat waddling. The muscles were well developed, the skin and hair soft and natural. Apart from a slight tendency to flat foot, the feet were normal. The sexual organs were well developed and the thyroid gland seemed natural. Mentally he was quite bright, but was very shy and sensitive. *Measurements.* Patient aged 7 years 2 months. (Those in brackets are measurements of normal boy aged 7 years 3 months.) Height standing $36\frac{1}{2}"$ ($46"$). Height sitting $23"$ ($23"$). From vertex to umbilicus $18\frac{1}{2}"$ ($19\frac{1}{4}"$); umbilicus to sole of foot $18"$ ($26\frac{1}{4}"$). Circumference of head $21\frac{3}{4}"$ ($21"$). From mastoid to mastoid across vertex $14\frac{3}{4}"$ ($14"$). Length of clavicle $4"$ ($4"$); humerus $5"$ ($8\frac{1}{2}"$); radius $4\frac{1}{2}"$ ($6\frac{3}{4}"$); ulna $4\frac{5}{8}"$ ($6\frac{5}{8}"$). Distance from wrist joint to tip of middle finger $4\frac{3}{8}"$ ($5\frac{1}{4}"$). Circumference of hand $5"$ ($5\frac{1}{4}"$). Length of second finger $2\frac{1}{4}"$ ($2\frac{3}{4}"$); third finger $2\frac{1}{8}"$ ($2\frac{1}{2}"$). Circumference of middle phalanx of third finger $1\frac{5}{8}"$ ($1\frac{3}{4}"$); of lower end of humerus $6\frac{1}{2}"$ ($6\frac{3}{4}"$); round crest of pelvis $18"$ ($22\frac{3}{4}"$). Antero-superior spine to internal malleolus $14"$ ($26\frac{1}{4}"$). Length of femur (great trochanter to external condyle) $6\frac{1}{4}"$ ($10\frac{1}{2}"$); tibia $5\frac{3}{4}"$ ($9\frac{3}{4}"$); fibula $6\frac{1}{4}"$ ($10\frac{1}{4}"$). Circumference of lower end of femur above condyles $9"$ ($9\frac{5}{8}"$); of middle third of leg $8\frac{1}{4}"$ ($11"$). (Bibl. No. 484, p. 34.)

Fig. 645. *Dide and Leborgne's Case.* I. 1, and I. 2, were normal. They had seven children, II. 1—7, of whom six, II. 1—6, were born dead. The seventh, II. 7, aged 63, was only 1 year old when he lost his mother. He began to walk late and only spoke when about 4—5 years old. He had a large head. He remained at an institution till he was 20, was then apprenticed to a shoemaker, but had to give up the trade as his sight was bad. He travelled about and at one time acted as a clown. He could read and write a little. Finally he was put in an Insane Asylum at Rennes. The remarkable things about him were the size of his head (the maximum circumference of which was 62 cm.), and his small height (134 cm.). The arms were very short. When he stood with arms extended by his sides, the palm of the hand was on a level with the great trochanter. There was a great disproportion between the length of the upper arm and forearm, the upper arm being 22 cm. long, the forearm 26 cm. long. Similarly the leg was longer than the thigh. Length of trunk from the episternal notch to the upper border of symphysis pubis was 63 cm. The lumbar curvature was very pronounced. *Measurements.* Length of humerus 22 cm.; forearm 26 cm. Total length from antero-superior iliac spine to ground 66 cm. From antero-superior iliac spine to spine of patella 27 cm. Length of fibula 27 cm. Circumference of calf 34 cm.; thigh 48 cm.; waist 72 cm. Perimeter of thorax 88 cm. The hand looked square; the fingers were of nearly equal length and divergent in extension ("main en trident"). The arms were rather incurved. The lower limbs were curved. The bridge of the nose was depressed, the intelligence very backward. (Bibl. No. 467, p. 200.)

Fig. 646. *Scharlau's Case I.* I. 1, and I. 2, were healthy and had 13 children, II. 1—13. II. 1—12, are stated to have been healthy. Nothing is said with regard to the health of II. 13. II. 14, her husband was a confirmed drunkard. II. 13, and II. 14, had four children. III. 1, the eldest was born when the

mother was aged 27, she was alive but very scrofulous, III. 2, also had a scrofulous appearance, and had an enormously thick head and exophthalmos, the third child, III. 3, a very strong boy with flat feet died, aged 1½ years, of diarrhoea and vomiting. The fourth child, III. 4, was born when the mother was 37, about three weeks before it was expected: she was not quite dead but died (not indicated on Plate) in spite of attempts at resuscitation. She weighed 3120 grammes. Her total length was 43 cm., 17 cm. of which length was the height of the head. The middle of the length was at the processus xiphoideus sterni. She was hydrocephalic, the fontanelles and sutures were widely patent, the eyes appeared small, the nose flat, the thorax broad and short, the abdomen large. The upper extremities, on which the skin lay in thick folds, were unusually short, with short broad hands. Externally no articulation could be perceived. The lower extremities were similarly shortened and were very much curved. (Bibl. No. 135, p. 411.)

Fig. 647. *Charpentier's Case*. I. 1, I. 2, and II. 1, the father, mother, brothers and sisters of II. 2, were all very tall. II. 2, aged 20, was only 1.15 m. in height. Her head and trunk were normal, whilst the extremities, particularly the lower, were short in a marked degree. She had walked at the age of 9 months and had had no disease during childhood. Her muscular power was considerable and her intelligence intact but to some extent puerile. Her very short limbs were markedly muscular and quite straight. The fingers and toes were remarkably short. The vertebral column was straight; the trunk, bust, skull and face were perfectly developed and corresponding to her age. Her head was enormous, with projecting forehead and very pronounced facial asymmetry. *Measurements*. From clavicle to vertex of skull 21 cm.; clavicle to great trochanter 50 cm.; great trochanter to patella 20 cm.; patella to sole of foot 24 cm. Upper limbs: length of upper arm 17 cm.; forearm 14 cm.; hand 12 cm.; middle finger 5 cm. She came to the Hospital for her confinement. Instruments were used and the child extracted alive, but it died shortly after. It presented the characteristics of a foetus of 6½ months old, and weighed 1520 grammes. *Measurements*. Total length 38 cm. From vertex of skull to umbilicus 22 cm.; umbilicus to heels 16 cm. Diameter occipito-frontal 10 cm.; mento-occipital 12 cm.; bi-parietal 4½ cm. (at moment of birth), 8 cm. (half-hour after). Sub-occipito-bregmatic 8½ cm. (Bibl. No. 162, p. 45.)

Fig. 648. *Lange's Case*. I. 1, and I. 2, were normal, and all the confinements of I. 2 had been normal. The pelvis of II. 2, who had been to the Hospital for her confinement, was normal. II. 3, aged 26, had been bottle-fed, but according to her mother was no different from other children at first. She began to walk at 9 months old. In her fourth year she had scarlet fever, measles and quinsy. At about this time the curvature of the lower limbs and the remarkable shortness of her arms were noticed, but walking was neither impossible nor painful. The doctor said she was rickety. She menstruated at 14. In order to avoid being noticed in the streets she had, since the age of 12, always been carried or driven, consequently she was easily tired and could scarcely walk twenty paces without help. In 1882 she had intercourse with a man, II. 4, aged 22, and 191 cm. in height. The pregnancy was normal. She was 92 cm. in height and a fairly well nourished person, and showed a certain degree of intelligence in her method of answering questions. The size of her head and the length of her trunk were noticeable in contrast with the shortness of the extremities. The head was rather dolichocephalic, the lower jaw showed no sign of rickets. There was no deviation of the spinal column, the chest was normal except for a slight rosary, the clavicles were normal. The lower limbs were shortened, curved forwards and remarkably hairy. The thighs were curved forwards. The lower epiphyses of the thigh-bones were slightly enlarged, those of the tibiae very much enlarged. The upper limbs were short, both arms and forearms showed slight curvature with concavity forwards. The epiphyses of the bones of the forearm were greatly thickened. The abdomen was somewhat distended. The external measurements of the pelvis were: distance of spines 18.8 cm.; distances of crests 19.2 cm.; external conjugate 13.7 cm. The child, a female, III. 3, was dead before birth. There was not much difficulty in its extraction. It was normally formed: weight without brain 2110 grms., length 49 cm., circumference of shoulders 34 cm. *Measurements of mother*, II. 3. Circumference of head 49.5 cm. Length of trunk from the tip of the spinous process of the seventh cervical vertebra to the tip of the coccyx 50 cm. Bi-acromial breadth measured in front 29 cm. Lower limbs, from the highest point of the great trochanter to the heel 35 cm. Thigh from the highest point of the great trochanter to the lowest point of the external condyle of the femur 18.5 cm. Length of leg from the external condyle of the femur to the heel 16.5 cm.; foot from the heel to top of the great toe 15.5 cm.; upper arm from tip of the acromion to tip of olecranon 19 cm.; forearm from tip of olecranon to the styloid process of the ulna 13.5 cm.; hand from the radio-carpal joint to the distal extremity 8 cm. Weight 26 kilos. II. 3, recovered from her confinement and left the Hospital. (Bibl. No. 201, p. 753.)

Fig. 649. *Auché's Case*. I. 1, I. 2, I. 3, and I. 4, were all well made and there had never been a dwarf in their families. II. 2, died from an accident at the age of 32. II. 3, aged 26, was healthy, and neither she, nor II. 2, was tuberculous, syphilitic or alcoholic. II. 3, was well made, and her height was 1.62 m. III. 2, the younger child, aged 18 months, was normal. III. 1, was born at term, the confinement was normal. At birth the large size of the head and the shortness of the legs were noticed. The child began to walk at the age of 14 months, but quickly became tired. The first tooth appeared at the age of 9 months; the last of the milk dentition at 2 years. The child began to speak late, but the intelligence

appeared normal. It had congenital inguinal hernia. The forehead was high and prominent, the face small in proportion to the cranium, but with large features. The bridge of the nose was broad and depressed, the extremity large and slightly retrousse. The mouth was kept almost constantly open. The palatine vault was high-arched. The trunk was normal, there was marked lordosis but no abnormal curvature of the vertebral column. When standing with arms extended by the sides, the palm of the hand was a little above the iliac crest. The hand was fleshy and square, with fingers nearly equal in length, and exhibited the features of the "main en trident." The foot was fleshy. The limbs showed no curvatures. The muscles were well developed and genital organs normal. *Measurements.* Height 73 cm. Circumference of head 53 cm. Bi-parietal diameter 17.5 cm. Maximum fronto-occipital diameter 21 cm. Total length of upper extremity 30.5 cm. Length of upper arm 11 cm.; forearm 11 cm.; hand from radio-carpal joint to distal extremity of middle finger 8.5 cm.; lower extremity from great trochanter to sole of foot 31.5 cm.; thigh 13 cm.; leg 13.5 cm.; foot 12 cm. (Bibl. No. 517, p. 116.)

Fig. 650. *Porak's Case II.* I. 1, and I. 2, were healthy. II. 1, aged 27, was their only child. Her height was 115 cm. She possessed the trunk and head of an adult; the head seemed too large, the root of the nose was depressed and she was very stout. Her extremities were very short and incurved, her mental faculties were intact. The upper extremities measured 40 cm. from the acromion to the end of the fingers; the lower extremities measured 48 cm. from the great trochanter to the soles of the feet. The clavicles were normal, the joints of the limbs large and the vertebral column straight, but there was an exaggerated lumbar curvature. She came to Hospital for her confinement. She said it was her first child. The child, III. 1, was extracted in pieces and therefore could not be examined. She went for a second confinement to Dr Ribemont Dessaignes, who told Porak he had performed Caesarian section and extracted a living child, III. 2, which exactly resembled its mother. The child was a girl and weighed 3650 grammes. Porak obtained the following particulars. *Measurements.* Foetal length 48 cm. Length from crown of head to umbilicus 30 cm.; umbilicus to soles of feet 18 cm. Head: occipito-frontal diameter 11.5 cm.; mento-occipital diameter 12 cm.; bi-parietal 11 cm.; sub-occipito-bregmatic diameter 10 cm. The mother died, the father took the child but afterwards abandoned her, and she died at a charitable institution for children. (Bibl. No. 247, p. 21.)

Fig. 651. *Marconi's Case.* No statement is made with regard to I. 1. I. 2, had always enjoyed good health, although she had suffered from venereal disease ("affezione celtiche"). She had had five children, II. 1—5, all breast-fed. Four of them, II. 1—4, were alive and healthy. II. 5, had died aged 2, the cause of death was not remembered by the mother. When seen I. 2 had been pregnant six months, she came for advice because she had floodings (décollement) of water followed by a considerable loss of blood at night between 2 and 3 p.m. Her general condition was good, her conformation regular and normal. A medical examination was made and a decision with regard to treatment arrived at. Finally an enormous placenta was expelled normally. The foetus was of the female sex and weighed 700 grammes. It looked like a soft raspberry-coloured mass of gelatinous texture, with a form roughly human and rudiments of hands and feet. What was most remarkable was the disproportion between the various parts of the body, the shape and shortness of the limbs compared with the almost normal size of the trunk, and the enormous head. The foetus was radiographed and Marconi states he believes it was a typical case of achondroplasia. (Bibl. No. 485, p. 634.)

Fig. 652. *Cestan's Case.* I. 1, and I. 2, were healthy. No syphilis, no alcoholism. II. 1, aged 12, was well made. II. 2, aged 9½, was born at term. The mother noticed the arms were short at birth. She walked and spoke at the age of 16 months. *Measurements.* Height 0.93 m. Height of head 21 cm. Breadth of head at the parietal eminences 17 cm. Upper arm 13 cm. Forearm and hand 22 cm. The back was flat, but the buttocks projected so that dorso-lumbar curvature was produced. The scapulae projected slightly; the pelvis exhibited an apparent arrest of development. The head was large, the nose large and flattened. The limbs were very short and "main en trident" was very pronounced. (Bibl. No. 385, p. 277.)

Fig. 653. *Winkler's Case.* I. 2, a strong muscular woman, had five children, II. 1—5. II. 1—4, were healthy. II. 5, who died at birth achondroplastic. When born it weighed 3850 grammes. *Measurements.* Length to umbilicus 28 cm.; to buttocks 35 cm. (of which 15 cm. was head height); to foot 44 cm. Transverse diameters: at shoulders 11.5 cm.; at buttocks 10.5 cm.; of head (ant.) 9.5 cm.; of head (post.) 11.5 cm. Occipito-bregmatic diameter of head 10.5 cm.; occipito-frontal diameter 13.5 cm.; sub-occipito-frontal diameter 10.5 cm. Circumferences of head (occipito-bregmatic) 4.1 cm.; (sub-occipito-bregmatic) 3.9 cm. The bones of the head were remarkably well ossified, the spine defectively ossified. Chest normal, clavicles normal. The scapula was less ossified, the cartilaginous parts predominated. The cartilages at the joints were remarkably thickened. Upper limbs: The epiphyses were everywhere thickened, although without all the centres of ossification. The diaphyses were all very short with an enormously thick cortical layer. The curvature of the humerus and the ulna was towards the front (nach vorn), that of the radius outwards. The pelvic girdle was smaller than normal, in shape a transverse oval. Lower limbs: The epiphyses were remarkably thickened but purely cartilaginous. The diaphyses very

short, with very thick compact outer layers. The femur and tibia were curved somewhat inwards below, the fibula curved a little backward. (Bibl. No. 143, p. 101.)

Fig. 654. *Megnier's Case II.* This is probably a case of achondroplasia with myxoedema. I. 1, died aged 60, of diphtheria. I. 2, died aged 64, of cerebral apoplexy. II. 4, died in childbirth, her son, III. 1, aged 17, was of low stature. II. 5—7, were alive and of low stature. II. 1—2, died at an early age. II. 8, aged 36, was 1.60 m. high, and had had syphilis, but had shown no signs of it for 12 years. He had been married seven years. His wife, II. 9, aged 30, suffered from sciatica and habitual headache. Her mother, I. 4, had died aged 57, of paralysis of the bladder. Her father, I. 3, had died aged 57, of a tumour in the loins; of her brothers and sisters, a brother, II. 11, died aged 17, of meningitis; a sister, II. 10, alive, was cardiopathic, and of the other four living brothers, one, II. 12, had disease of the bladder. They were all tall. II. 9, never had syphilis. Her first child was III. 2, an achondroplastic girl, after three years she had a miscarriage at three months, III. 3; and about two years later another miscarriage, III. 4. III. 2, aged 6 yrs. 3 mths., was born at term and breast-fed for three months. When born, the mother noticed that her legs were short. She began teething at 18 months old, and the teething continued till she was 5 years old. At the age of 2, she had gastro-enteritis for a month, otherwise had had no illness, but was dyspeptic. When a year old she could not lift her head from the trunk, at 4 years the erect posture was possible but when seen it was still difficult. She had umbilical hernia, but it was almost cured. From the age of 2 to 5 she did not appear to have much intelligence. Her general appearance was cretinoid. The thorax was compressed at the sides and projecting in front, and unduly wide at the base, and no rosary existed. There was no lateral curvature of the spinal column. The abdomen was very prominent. *Measurements.* Length of the sternum 10.5 cm.; clavicle 10 cm. Length from the episternal notch to the umbilicus 20 cm.; episternal notch to the upper border of symphysis pubis 48 cm.; distal extremity of xiphos-ternum to upper border of symphysis pubis 18.5 cm.; vertex to the upper border of symphysis pubis 33 cm.; upper border of symphysis pubis to the ground 31 cm.; antero-superior iliac spine to base of feet 37 cm. Maximum pelvic circumference 48 cm. The limbs appeared thick and solid, the calves greatly developed, the hands square, the toes large, and the feet thick and fleshy and rather flat. Length of thigh from the antero-superior iliac spine to the external condyle 18.7 cm.; great trochanter to external condyle 16.5 cm.; leg 16.5 to 17 cm. Maximum length of feet 12.8 cm. Length of first toe 2.4 cm.; second toe 2.3 cm.; third and of fourth toes 2.2 cm.; fifth toe 1.9 cm. Length from acromion to distal extremity of middle finger 31 cm. Length of upper arm from acromion to olecranon 11.5 cm.; forearm from olecranon to the styloid process of radius 9.4 cm. Transverse diameter of hand to the beginning of fourth finger 6 cm. Length of index finger 3.8 cm.; middle finger 4.1 cm.; ring finger 3.7 cm.; little finger 3.1 cm. Radiographs of the lower limbs showed that the bones were regular in form, that the epiphyses although somewhat deficient in the part which was still cartilaginous, were notably enlarged, whilst the diaphyses had their volume much reduced in the middle part. (Bibl. No. 466, p. 486.)

PLATE LIII. Fig. 655. *Horand's Case I.* I. 1, and I. 2, were normal and had never suffered from rheumatism, tuberculosis or syphilis. Of their children, II. 4 was well-made; II. 3 was very small, but nothing further is said of him; II. 2 was of medium height, well made and had never had rheumatism, tuberculosis or syphilis. She married II. 1, who had never been ill, was very tall and robust and was neither alcoholic, syphilitic, nor tuberculous. They had three children, III. 1—3. III. 1, a girl, aged 8½ was tall, handsome and very intelligent, height 1.29 m. III. 3, a girl of 10 months old, was healthy and well made. III. 2, aged 6, was born when II. 1 was aged 30 and II. 2 aged 27. The birth was normal; he was breast-fed and weaned at 14 months old, he then had violent headaches. He had his first tooth at 6 months old, began to speak at 1 year and to walk at 14 months. At 4 years of age he became deaf in both ears for a while. His head was large in comparison with the trunk; all the fontanelles were closed. The frontal eminences were very prominent, he had a large forehead, slight facial asymmetry and short nose flattened at the bridge. The eyelids had no cilia; the palate was high-arched and the neck short. The trunk was of normal dimensions, the limbs very short. When standing with arms extended by the sides the extremity of the middle finger reached to just below the great trochanter. The humerus was thick and compact with slight outward curvature; its epiphyses were broad and thick. The arms were somewhat abducted from the trunk. The hands were large, thick, fleshy and almost square; the fingers were nearly equal in length, short and thick, and diverged in extension so as to form the "main en trident." The lower limbs were very short and thick. The patellae were much nearer the inguinal folds than is normal. The lower extremities had two curvatures, the one with an anterior concavity from the antero-superior iliac spine to the great toe and one with an external concavity from the antero-superior iliac spine to the external malleolus; the curvature was more marked on the left side owing to a slight degree of genu valgum with an inward rotation of the tibia. The feet were large and broad, the plantar arch rather flattened. The great toe diverged markedly from the second toe. The buttocks were prominent and the joints of the limbs large. There was exaggeration of the lumbar curvature. His intelligence was fair; he went to school. The genital organs were well developed. The thyroid gland was not enlarged. *Measurements.* Weight 17.50 kg. Height given twice and differently as 85 and 89 cm. L. humerus 12½ cm.; radius 12 cm.; ulna 12½ cm. R. humerus 13 cm.; radius 11 cm.; ulna 13½ cm. R. lower extremities from antero-superior iliac

spine to external malleolus 36 cm. L. lower extremities: antero-superior iliac spine to external malleolus 36 cm.; femur (from the antero-superior iliac spine to the line of articulation of the knee joint) 21 cm. The R. tibia $13\frac{1}{2}$ cm. L. tibia $14\frac{1}{2}$ cm. (Bibl. No. 486, p. 927.)

Fig. 656. *Parhon, Shunda and Zalplachta's Case*. This is an undoubted case of achondroplasia, associated with kyphosis in the lower dorsal region and kypho-scoliosis above this. Probably these are rickety in origin; they may be statical, or of adolescence, or possibly but not probably of achondroplastic origin. I. 1, was alive and of medium height. I. 2, was dead, cause unknown. They had nine children, II. 1—9, of whom three, II. 1—3, were dead; five, II. 4—8, were alive and of normal height. II. 9, aged 33, was exhibited in a fair. The palatine vault was high-arched; the hair was long and glossy; beard and moustache were well grown. The limbs were very short. When the arms were extended by the sides, the hands just reached the level of the upper border of the great trochanter. *Measurements*. Height 105.5 cm. Circumference of head 57 cm.¹ Anterior semi-circumference 31.4 cm. Posterior semi-circumference 20.5 cm. Antero-posterior circumference 37.5 cm. Transverse circumference (measured from insertion of one ear to that on the opposite side or from one zygomatic apophysis to the other) 35.5 cm. R. middle finger 6.8 cm. R. hand (from styloid process of radius to base of index finger) 6.5 cm. R. forearm (from the summit of the olecranon to the styloid process of the ulna) 16 cm. R. upper arm (from internal epicondyle to acromion) 16.5 cm.; (from acromion to external epicondyle) 16 cm. R. foot (from posterior surface of calcaneum to distal extremity of great toe) 16.8 cm. R. leg (from the line of the knee joint to the external malleolus) 17 cm. R. femur (from great trochanter to external condyle) 18.5 cm. The "main en trident" present. Kypho-scoliosis in the upper half of the dorsal region and very pronounced kyphosis in the lower. The lumbar curvature appeared exaggerated. The mental condition was rather puerile. (Bibl. No. 488, p. 539.)

Fig. 657. *Macewen's Case*. I. 1, and I. 2, were normal as were all their other relatives. Of their eight children, six, II. 1, were normal. II. 2, who immediately preceded II. 3 in age, was slightly under medium height and was affected by rickety curves of the bones of the lower extremities. She did not walk till she was 7. II. 3, aged 16, did not speak till she was $2\frac{1}{2}$ years old and was 4 years old before she began to walk, crutches being required at first to aid her. Besides the usual illnesses of childhood she suffered from general ill-health and was always feeble; the deformity of the bones began to appear when she began to walk. She was 3' 6" in height, markedly stunted and of heavy build but active and with her intelligence practically perfect. Her head was large and the root of the nose depressed but prognathism was only slightly marked. The limbs were markedly affected, the humeri, radii and ulnae being much curved with greatly enlarged extremities. The trident hand was well marked though the fingers were a little long. The curving of the femora and tibiae was pronounced. There was marked lordosis with consequent protuberance of the abdomen. The central point of the body was well above the umbilicus. (Bibl. No. 533, p. 1646.)

Fig. 658. *Rankin and Mackay's Case*. No statement is made with regard to I. 1. I. 2, was healthy. She had three sons, II. 1—3. II. 1, aged 12, was normal. II. 2, died of "wasting" aged 3. II. 3, aged 9, was born normally but was misshapen at birth. Apart from deformities he was healthy and vigorous and his intelligence was above the average. He was well nourished with a healthy and smooth skin. His head was abnormally large, the dome of the cranium high and the occipital region unduly prominent. The nose was flattened and depressed at the bridge, the mouth partially open. He was pronouncedly prognathous. The palate was arched and high and the voice nasal. The trunk was of average size, the sternum projected forwards, and there was distinct costal rosary and well-defined Harrison's sulcus. The abdomen was protuberant partly on account of lordosis of the spine. The gait was clumsy. The arms were thick and short, and when extended barely reached the tips of the great trochanters. All the joints were prominent. The shaft of the humerus was short being only $\frac{5}{8}$ " longer than the clavicle, and the bones of the forearm were shortened, with a decided increase in the normal curve of the radius. The hands were "remarkably foreshortened," the fingers tapering towards points and deviating from one another like the spokes of a wheel. In the legs there was a general shortening of the bones, an increase of normal curvature and enlargement of the extremities. The longitudinal arch of the foot was destroyed giving rise to flat foot. *Measurements*. Height 2' 11". Sitting 2' 1". Weight 2 st. $7\frac{1}{2}$ lbs. Circumference of head 20 $\frac{3}{4}$ ". Tip of mastoid to tip of mastoid 15" (? over vertex). Clavicle 4". Acromion to external epicondyle $4\frac{5}{8}$ ". Radius $3\frac{3}{8}$ ". Olecranon to styloid process of ulna $4\frac{1}{4}$ ". Antero-superior iliac spine to internal condyle $7\frac{1}{4}$ ". Internal tuberosity of tibia to malleolus $5\frac{1}{2}$ ". Chest, full expiration 20 $\frac{1}{2}$ ". (Bibl. No. 518, p. 1522.)

Fig. 659. *Romberg's Case I*. Nothing is stated about I. 1, and I. 2. II. 1—2, were twin foetuses of the ninth month in the Royal Anatomical Museum of Berlin, one male and one female. Both had large heads; in the female foetus, II. 2, the occiput protruded considerably as a distended sac. The chest and abdomen were unusually large, the extremities excessively short, about one-fourth of the usual length. The feet appeared to be turned in. The head was larger than usual and bulging laterally, but the ossification was normal. The neck was of the usual length. The thoracic cavity was proportionally bigger than normal, for the ribs formed a relatively large arch as they approached the sternum. Both ribs and

¹ Does not appear to be sum of two semi-circumferences.

clavicles were normally ossified. The extremities were markedly abnormal. In the upper the humerus formed an angle with the scapula which was more obtuse than acute and was curved, the convexity being external. The ulna and radius, throughout their middle parts, showed a curvature with convexity outwards in the same line as that of the humerus, but then curved inwards, so that the whole arm was excessively shortened and curved. The pelvis was normal. The femur was curved so that it had an anterior concavity and formed an obtuse angle with the pelvis. The tibia and fibula almost formed a semi-circle, with external curvature to middle portion and then curving in. (Bibl. No. 61, p. 28.)

Fig. 660. *Romberg's Case II.* I. 1, and I. 2, were healthy. I. 2, said that in the first months of her pregnancy she had been liable to spasms which affected her throat. II. 1, was born with deformed limbs. The head was bigger than normal, the face swollen and reddish in colour. The fontanelles were widely opened, especially the posterior. In the posterior superficies of the skull the defect of the occipital bone was supplied by a thick cartilaginous elastic membrane. The calvarial bones were separated by membranous spaces. The neck was very short. The thorax was flat and depressed in shape and the arch of the ribs looked less convex than in healthy children. The limbs were greatly deformed. Both humeri were curved, with convexity externally, so that the arms appeared contracted and short. The L. humerus was much depressed at the site of insertion of the deltoid muscle. The forearm formed an obtuse angle with the arm. There was an external convexity as far as the middle third of the limb, and it then again curved inwards. The femora almost formed a semi-circle and the tibia showed curvatures with convexity outwards; the soles of the feet were turned in. The skin of the whole body was flaccid and soft to the touch. Romberg saw her again six months later and she appeared worse. The fontanelles were still wide open. There was no sign of teeth. She had difficulty in breathing and was very emaciated. (Bibl. No. 61, p. 22.)

Fig. 661. *Treub's Case.* I. 1, and I. 2, were of normal size and no case of achondroplasia was known among their ancestors or collateral relatives. It does not state whether I. 1 and I. 2 had any normal children. II. 2, was achondroplastic, she lived with a man of normal stature, II. 1. She was intelligent enough but troublesome and it was with great difficulty she was photographed. Caesarian section was performed and a normal girl, III. 1, was extracted who weighed 3000 gms. and whose length was 49 cm. No other measurements of either mother or child are given nor does it state whether they lived or died. II. 3, a younger sister of II. 2, was said to resemble her in every particular, and there was also a brother, II. 4, who had died aged 2, and who was said to be a dwarf. (Bibl. No. 471, p. 58.)

Fig. 662. *Daniel's Case.* II. 2, denied ever having had syphilis and said there was no degeneracy in his parents or ancestors, or collateral relatives; his father, I. 2, had a twin sister, I. 1. I. 4, aged 52, was healthy; I. 3, aged 55, had when 12 years old an affection of the joint of the right leg, in consequence of which it was shorter than the left by "quatre travers de doigts." II. 4, aged 25, was well formed. The original runs "La femme (II. 3) a une sœur parfaitement bien constituée. Au point de vue obstétrical, elle a eu deux accouchements, à sept mois, enfants mort-nés." As further on it states II. 3 was a primipara, presumably it was the sister, II. 4, who had the two still-born children, III. 2—3, and they have been so entered in the pedigree. II. 3, aged 29, a "crochetouse," came to hospital for her confinement. She had walked at 1 year old, never had had any serious illness, had measles in infancy and rheumatic pains at age of 13. She had been married seven years, had no trace of syphilis or genital troubles and denied alcoholism. She was tall and robust and this was her first confinement. The trunk of the child was expelled normally, but when they were trying to extract the head, and were using no violence, it suddenly burst and the brain hemispheres were thrown on the bed. The child, III. 1, was a female and weighed 1250 gms., the trunk was almost normal, but the shortness of the limbs was noticeable. Two sets of measurements are given, in two cases they are not in agreement so both are recorded here. *Measurements.* Total length of body from the occiput to the heels 32.8 cm. (32 cm.). Distance of umbilicus from heels 13.8 cm.; from occiput 19 cm. (18.2 cm.). Total length from the coracoid process to tip of middle finger 11.1 cm. Length from the coracoid process to elbow (forearm bent) 4 cm.; elbow to wrist (hand bent) 4 cm. Length of hand from the wrist to tip of middle finger 3.1 cm. Total length from great trochanter to heels 9.7 cm. Length of thigh from great trochanter to knee (lower part of leg bent) 4.7 cm.; from the knee to the heels 4.4 cm.; of foot from heel to tip of great toe 5 cm. (Bibl. No. 456, p. 30.)

Fig. 663. *Poynton's Case.* I. 1, and I. 2, were healthy and had eight healthy children, II. 1—8. II. 9, aged 7, was a full-term child. He had a large, square head, circumference being $21\frac{1}{2}$ ". His expression was intelligent and the intelligence was normal. The trunk was disproportionately long in comparison to the length of the extremities, which were very short. There was well-marked projection of the nates. The disposition of the fingers was ray-like. The external auditory meatus was directed inwards and not inwards and forwards. *Measurements.* Length of trunk 13"; humerus $2\frac{1}{2}$ "; forearm $3\frac{1}{8}$ ". Distance from antero-superior iliac spine to adductor tubercle $9\frac{1}{8}$ ". Distance from the knee joints to the internal malleoli $5\frac{1}{4}$ ". (Bibl. No. 527, p. 431.)

Fig. 664. *Nijhoff's Case I.* I. 1, 2, 3 and 4, were normal. II. 1, was "a dwarf." II. 2, normal. These two had eight children, four boys and four girls, of which three boys and three girls were "dwarfs,"

and the last two girls, at any rate, were achondroplastic. III. 1, "a dwarf," died unmarried. III. 2, also "a dwarf," married a normal woman, by whom he had one male child, IV. 2, normal, and a child, IV. 1, who died young. III. 4, "a dwarf," died before 30 years of age "in parturition"; no note as to characteristics of child, IV. 3. III. 6, normal, married, III. 7, a normal woman, and by her had five normal children, IV. 4—8. III. 8, "a dwarf," married (presumably to a normal woman), has no children. III. 10, normal, married to a normal man, III. 11, has two normal female children, IV. 9 and 10; III. 12, "a dwarf," typically achondroplastic, married to III. 13, a normal man, has had one child, a normal female, IV. 11, delivered by Caesarian section. III. 14, "a dwarf," typically achondroplastic, married to a normal man, has one child, a female, achondroplastic, IV. 12, delivered by Caesarian section. Professor Nijhoff kindly furnishes the following details concerning III. 12 and III. 14. III. 12, Aaltje B. Height 122 cm. From excellent photographs (see Plate PP, (89), (90)), very kindly furnished by Professor Nijhoff, it can be clearly seen that she is typically achondroplastic. Married, Caesarian section performed for delivery of first child, IV. 11, in 1890, in Dr Sanger's Clinic, Groningen. Both mother and child survived. The latter, a normal female, lived 9 years. III. 14, Janna B., sister of III. 10, aged 41 years; height 123 cm. *Pelvic measurements.* Interspinous 22 cm. Intercristal 23 cm. Intertrochanteric 31 cm. External conjugate 17 cm. Diagonal conjugate 7 cm. Delivered of her first child, IV. 12, by Caesarian section by Professor Nijhoff, in the Groningen Clinic, on Oct. 14th, 1899. From very fine photographs (see Plate PP (91), (92)) kindly furnished by Professor Nijhoff it can be seen that she is typically achondroplastic. Professor Nijhoff also states that the child, a female, was achondroplastic, and furnishes the following measurements of it compared with those of a normal child: Weight 3170 gms. Total length 47.5 cm. (50 cm.). Length of arm above elbow 8 cm. (11 cm.), below elbow 7 cm. (9.1 cm.); middle finger 3.0 cm. (4.5 cm.); leg above knee 9.5 cm. (11.5 cm.), below knee 7.5 cm. (10.5 cm.); foot 7.0 cm. (8 cm.); big toe 1.8 cm. (2.6 cm.). (See Bibl. No. 396.)

Fig. 665. *Lunn's Case.* I. 1, was 6' 2" in height, I. 2, 5' 10" in height. They had five children, II. 1—5, of whom II. 1—3 and II. 5 were all in good health. II. 4, aged 53, had been stunted from birth; he lost the use of his limbs for six months at the age of 3, and since then his legs had been bowed. At the age of 17 or 18 he became a coal porter, which occupation he followed for nine years, since then he had been a road labourer in Paddington. He had always enjoyed good health except for bilious attacks, but eight years ago he began to suffer from sciatica which eventually compelled him to give up work. His forehead was prominent, the bridge of the nose rather deficient, the eyes deeply set, the palate arch rather high. The legs were very bowed, there being great curvature of the tibiae. The feet were short and square, the toes being nearly all of the same length. There was little curvature in the bones of the upper limbs. The fingers were more nearly of the same length than normal, and the middle and ring fingers diverged at the first interphalangeal joint. He had lordosis and prominence of the abdomen. The umbilicus lay midway between the crown of the head and the soles of the feet. The finger tips reached $1\frac{1}{4}$ " below the great trochanters. The genital organs were normal and the intellect good. *Measurements.* Height 4' 6". Sitting height 2' 9". Circumference of head 24". Length of clavicle $5\frac{1}{4}$ ". Distance from the acromion process to the external condyle $6\frac{3}{4}$ ". Length of radius $6\frac{1}{4}$ ". Distance from olecranon to styloid process of the ulna 8". Distance from the antero-superior iliac spine to the internal malleolus R. $18\frac{1}{4}$ ", L. $18\frac{1}{2}$ ". Distance from the internal tuberosity of the tibia to the internal malleolus $7\frac{1}{2}$ ". Chest full expansion 35". (Bibl. No. 536, p. 252.)

Fig. 666. *Swoboda's Case.* Of I. 1, I. 2, I. 3, and I. 4, nothing is stated. II. 2, had been seven years in an insane asylum. II. 3, was a waiter, of middle height and very nervous. II. 4, a waitress, was tall and healthy as were also her eleven brothers and sisters, II. 5—15. There was no trace of syphilis and alcoholism was denied. II. 3, and II. 4, had six children of whom III. 1, aged 10, was the eldest, III. 2—6, were normal, and there had been three miscarriages, III. 7—9. When III. 1 was born, no shortness of limbs was noticed but she had congenital left-sided genu valgum and flat feet. The grandmother said III. 1 was small and thick at birth and so soft and flabby they were afraid to lift her. If the disproportion between the body and limbs existed it was not noticed; from photographs taken at age of 2 and 3 years one could only gather that the hands had the characteristic triangular form and only reached to the trochanter. The child was weakly at first, but learnt to walk at the end of the first year, she had a large head and was thought rickety. In consequence of sitting a great deal a high degree of lumbar kyphosis developed. The mother had her examined about 40 times by doctors who said she had rachitis. At age of 6 months she began to teethe, and when she began to walk the lumbar kyphosis changed to lordosis. She soon became strong and muscular. She was brought to hospital the last winter (1897) for infectious vulvitis and was recognised as an achondroplastic dwarf. She had a projecting lower jaw with prominent forehead and depressed nose. The trunk and neck were of normal length and the thyroid gland was normal. The sternum was broad and thick, the abdomen abnormally large. The genitals were normally developed with an abnormal amount of pubic hair for her age. The hands were short and broad and of characteristic main-en-trident shape. The three middle toes of each foot had also the triangular shape. The congenital genu valgum had cured itself. Her weight was 23 kilos and her intelligence well developed. *Measurements.* Height 104 cm. Circumference of head 54 cm. Length of sternum 14 cm.

Circumference of thorax 60 cm. Diameter of chest 11 cm. instead of a normal 19.75 cm. Length of upper arm 15.5 cm.; forearm 15 cm.; thigh 15.5 cm.; leg 20 cm. (Bibl. No. 429^b, p. 670.)

Fig. 667. *Keyser's Case*. There are very few details given of this case. I. 1 was 4' 8" in height. I. 2 was normal, only the one child is mentioned, II. 1, aged 2½ years. The bridge of the nose was markedly depressed; with hanging arms the hands only reached to the umbilicus, the hands were trident shaped, kyphosis was present but no lordosis. *Measurements*. Height 25.75". Circumference of head 19". Length of humerus 3"; forearm 3.25"; femur 5.5"; leg 3.75". (Bibl. No. 526, p. 1602.)

Fig. 668. *Durante's Case*. I. 1, and I. 2 died of phthisis. II. 2 had never been strong, at the age of 28 she had bronchitis with haemoptysis. She married when aged 29 and her first child, III. 1, was alive and healthy. At age of 32 or 33 she became pregnant a second time and was seized with violent vomiting day and night, which could not be stopped. The doctor tried to procure abortion on account of her health but failed. She came to hospital, and showed symptoms of tuberculosis and hysteria, and also had lateral nystagmus. She died in the fifth month of her pregnancy. After death the child was extracted by Caesarian section. It had short, cylindrical, sausage-shaped, incurved limbs covered with thick skin which lay in folds. *Measurements* of the foetus are given. (Bibl. No. 412, p. 812.)

Fig. 669. *Smeeton's Case*. I. 1 was a poor fisherman; he and his wife, I. 2, were of ordinary height and had eight children, II. 1—8, of whom seven, II. 1—7, were normal. II. 8, Wybrand Lolkes, was born at Jelst, in Western Friesland, 1730. He showed great mechanical talent and was apprenticed to a watchmaker and became a very clever workman. He went to Rotterdam and married, but business not being flourishing, he exhibited himself in many Dutch towns and then went to London and was exhibited by Astley in 1790. He was then 60 and measured 27". His wife always appeared with him. They had three children, III. 1—3, one of whom, a son aged 23, was 5' 7" high. II. 8, died in Holland. His portrait is reproduced by Smeeton and is also in *Le Magazin Pittoresque*, 1839, p. 333. (Iconography, No. 142.) He is described by Regnault (Bibl. 411) as achondroplasic, also referred to in the Introduction (see our pp. 360 and 362). His picture in Smeeton's *Biographia Curiosa* looks achondroplasic but the trunk seems rather shorter than normal. Iconography, Nos. 162, 164. (See Bibl. No. 69^b, p. 38.)

Fig. 670. *Méry and Labbé's Case*. There was nothing abnormal about I. 1 and I. 2. I. 2, had 12 pregnancies. Two, II. 1—2, ended in miscarriages at 2 months and 3½ months respectively. Four children, II. 3—6, died of gastro-enteritis before the age of 3 months. Six children survived, II. 7—12. II. 7, was healthy and serving as a soldier. II. 8—10, were healthy. II. 11, at the age of 5 months had Potts' disease which was cured, but left a fairly pronounced gibbosity. II. 12, aged 12, was a dwarf. Apparently he had had all the diseases of childhood, scarlatina, measles, varicella and meningitis (?) attacks, and for many years had chronic blepharitis. He was born at term, and the abnormal size of his head and the shortness of his limbs were then noticed. His limbs were so short that his mother could not carry him comfortably on her arm till he was 5 years old. He had always grown slowly and was about the size of a child of 4 years of age. The trunk was nearly normal, the limbs short and thick, the head large. Standing with his hands hanging by the sides, the end of the hand did not reach the level of the great trochanter. The right hand hung a little lower than the left owing to spinal deformity. The clavicles were almost normal, with exaggerated curvature on both sides. The spinal column showed double scoliosis, very marked concavity to the right in the dorsal region and to the left in the lumbar region. In consequence of this deviation the thorax was deformed, its left side projected behind; on the right side, in the mammary region, there was a deformity as if a blow of an axe had been given; there was a sharp bend in the wall of the thorax forming a kind of dihedral angle. The right side of the chest projected in front, the right shoulder was lower than the left and there was lumbar curvature. The muscles of the lower extremities were greatly developed, the bones were thick and the epiphyses much hypertrophied. There was no abnormal curvature, but the normal curvature was much exaggerated. The feet were large and square, very large in proportion to the leg. In the upper extremities, the forearm was noticeably longer than the upper arm, the volume of the diaphyses was out of proportion to the length and the epiphyses were hypertrophied. The hand was fleshy, the fingers square at the end and pudding shaped and differed very slightly in length. The hand exhibited the peculiarities of main-en-trident and its size was disproportionate to the rest of the arm. The frontal and parietal bones projected, so that the forehead projected considerably and there was noticeable widening of the bi-parietal diameter and apparent flattening of the upper part of the skull. The nose was flattened and enlarged at its upper part. The face appeared rather large. The intelligence was fairly developed, he could read and write. The external genital organs were but little developed, they were not, however, abnormal considering the age of the child. *Measurements* (taken Nov. 1901). Total height 96 cm. Length of spinal column measured from the seventh cervical to fifth lumbar vertebra 36 cm. Circumference of thorax at level of nipples 53 cm. Length of clavicles 11 cm.; thigh from the tip of trochanter to the interarticular cleft of knee 20 cm. From the interarticular cleft of knee to external malleolus 19 cm. Circumference of base of thigh, R. 34 cm.; L. 33 cm. Length of foot from posterior part of heel to tip of great toe 17 cm.; upper arm from the large tuberosity of the humerus to the bend of the elbow (both sides) 10 cm.; forearm from bend of elbow

to upper fold of wrist (R.) 13 cm., (L.) 12 cm. Total length from acromion to middle finger 33 cm. Length of hand both sides 11.5 cm. Circumference of head 51.5 cm. Sub-occipito-bregmatic circumference 48 cm.; sub-occipito-frontal circumference 49.5 cm. Circumference corresponding to maximum diameter of Budin 56.5 cm. At the end of Dec. 1901, he had grown .5 cm. He was treated with thyroid extract in tablets, and when seen in May, 1902, the measurements were as follows. *Measurements* (May, 1902). Height 110 cm. Length from the upper extremity of the sternum to umbilicus 29 cm. Circumference of chest at nipples 55 cm. Length of arm from the acromion to the end of the index finger 38 cm. From the antero-superior iliac spine to the lower extremity of the external malleolus 51 cm. (Bibl. No. 410, p. 543.)

Fig. 671. *Rudaux's Case*. This case was described by Rudaux after he had reported Le Lurier's Case (Pedigree 676). I. 2, aged 39, came for her seventh confinement. Her six previous children, II. 1—6, were all normal, five had been born normally, with one of them the forceps had been used. One of these six children, II. 1, had died aged 5 months of gastric intestinal trouble (*not noted on Plate*). The seventh child, II. 7, was a girl of the characteristic achondroplastic type. Her weight was 1920 grammes, length 32 cm. She died next day. Head diameters: occipito-mental 12.2 cm.; occipito-frontal 10.2 cm.; sub-occipito-bregmatic 8.5 cm.; bi-parietal 10 cm.; bi-temporal 8 cm. (Bibl. No. 524, p. 128.)

Fig. 672. *Lequeux's Case*. I. 3, was a primipara, there was no syphilis, rachitis, tuberculosis or intoxication of any kind in her family. I. 2, was rather given to absinthe and had lost a child, II. 1, by a previous marriage suddenly. The confinement was normal and II. 2 was born, weight 3500 grammes. *Measurements*. Total length 44 cm. Length of trunk 24 cm. Abdominal circumference 13 cm. Length of upper limb from acromion to the digital extremities 10.5 cm.; lower limb from the iliac spine to the heel 13 cm. Circumference of head 38 cm. Head diameters; bi-parietal 11.7 cm.; bi-temporal 11.3 cm.; occipito-mental 16 cm.; sub-occipito-frontal 11.3 cm.; sub-occipito-bregmatic 12 cm. The hand was trident-shaped, the limbs short and squat and marked by deep furrows. (Bibl. No. 472, p. 150.)

Fig. 673. *Laffargue's Case*. There is no other case among collaterals or ascendants. The individuals, II. 1—2, were brothers, of mixed race, a Berber negro race with predominance of negro. II. 1, aged about 30, had a peculiar gait, thick-set hands and feet and slightly curved limbs with concavity directed inwards. II. 2, aged about 25, hands and feet like those of his brother II. 1, short but of normal breadth. His gait was peculiar and the curvature of his lower limbs very pronounced with concavity directed inwards. They had no siblings.

	II. 1 cm.	II. 2 cm.		II. 1 cm.	II. 2 cm.
<i>Measurements:</i>			<i>Measurements:</i>		
Height from the ground			Breadths: span	105	116
to Vertex	128	114	" from one acromion to the other	29	32
" Acromion	105	88	" from one iliac crest to the other	26	27
" Epicondyle	78	70	Length of foot	20	20
" Styloid process of			Length of thumb	5.5	9
radius	64	56	Lumbar concavity	5	
" Lower extremity of			Skull and face. Maximum antero-posterior		
medius	53	41	diameter	20	21
" Great trochanter	57	56	Maximum transverse diameter	14	16
" Interarticular cleft			Bizygomatic diameter	12.5	11
of knee	32	31	Length of face	14.5	12
" Internal malleolus	7	7	Minimum frontal diameter		13
Length of trunk	58	52	Height of auditory meatus from the ground	120	104

(Bibl. No. 343, p. 515.)

Fig. 674. *P. Marie's Case*. I. 1, was well made and not alcoholic. He died aged 33 of acute meningitis. I. 2, was well made, and knew of no case of abnormal stature in her relatives, who had been remarkable for their height and longevity. Only two children are mentioned; II. 2, who was alive and well made and II. 1, aged 18. II. 1, was born at term, the birth was natural, he was breast-fed for 20 months, walked and spoke at 18 months. His head was too much developed, his palate very arched, and his hand trident-shaped. He was not intelligent and could not learn to read and write. *Measurements*. Height 107.5 cm. Length of upper extremity from the acromion to the tip of the middle finger 37 cm.; upper arm 11 cm.; forearm 15 cm.; the lower extremity from the great trochanter to the ground 43 cm.; thigh 18.5 cm.; leg 22.2 cm. Distance between the jugular notch and upper edge of pubis 41 cm. (Bibl. No. 371, p. 17.)

Fig. 675. *Herrman's Case*. I. 1 and I. 2, were Russians, and II. 11 was born in Russia. The family history was negative, no similar case had occurred in any branch of the family. I. 2, had had

nine children, of whom four, II. 1—4, died in infancy, she had no miscarriages. Four daughters were living, physically and mentally normal and in good health. II. 7 and II. 9, were married and had healthy children, III. 1 and III. 2. II. 11, aged 15, was born normally, was breast-fed for two weeks, and then artificially fed, while in care of another woman. After 10 months he was returned to his mother in poor condition. The mother noticed then that his head was large and his limbs short. He began to teethe at the age of 9 months, could sit up at 5 years, stand at 6 years, and walk at 7 years of age. He began to talk distinctly and intelligently at 7. His weight was 60 pounds. The bones of the skull were well developed, the root of the nose depressed, the chest well formed and the extremities very short. The fingers reached only to the great trochanter, they were of nearly equal length and had the characteristic trident form. The musculature of the arm and the enlarged extremities of its bones gave it a peculiar knotted appearance. The lower extremities were short and muscular, the femur being shorter than the tibia. The marked curvature of the legs was entirely lateral. The genitals were well developed and pubic hair abundant. The intelligence was retarded. *Measurements.* Height 117 cm. Occipito-frontal circumference of head 54.5 cm. Length of upper extremity from the acromion process to the tip of the middle finger 45 cm.; upper arm 15.5 cm.; forearm 17 cm.; hand 14.5 cm.; the lower extremity from the antero-superior spine to the sole 53 cm.; femur 22 cm.; tibia 25 cm. Circumference of chest 69 cm.; neck 29 cm.; abdomen 58 cm. Distance from the vertex to the umbilicus 60 cm. (Bibl. No. 449, p. 18.)

Fig. 676. *Le Lurier's Case.* I. 1, died aged 56 of phthisis. I. 2, was healthy. II. 6, was well proportioned, she had five brothers and sisters in good health, II. 1—5, and had lost none. At 8 years of age she had measles. She married II. 7, a healthy cab-driver. There was no case of achondroplasia in the family. Her first child, III. 1, was alive. He was born in 1901 and the forceps had been used at his birth. The second, II. 2, was born normally in 1903 and died of broncho-pneumonia aged 22 months. The third, III. 3, a girl, was achondroplastic and weighed 3250 grammes. (Bibl. No. 524, p. 127.)

Fig. 677. *Moir's Case.* II. 2, aged 58, was a Chinaman. His parents, I. 1 and I. 2, natives of Hankow, were of normal build, but were dead. He was married and had a son and a daughter, III. 1—2, but they were not seen. He was intelligent, bright and alert. His head was large and globular, the bridge of the nose depressed, the palate normal. The lower limbs were short but remarkably well developed muscularly. He was somewhat flat-footed, but the legs were well formed; the ribs were normal. The hanging arms reached only to the crest of the ilium, the radius was not enlarged at the lower end (see our Plate R (11)—(13)). *Measurements.* Total height 42 $\frac{3}{4}$ ". Height of umbilicus from the ground 19". Circumference of head 22 $\frac{1}{4}$ ". Length of clavicle 2 $\frac{3}{4}$ ". Distance from tip of mastoid to tip of mastoid 7" (how measured?). Length of radius 2 $\frac{3}{4}$ ". Distance from olecranon to ulnar styloid process 5"; antero-superior iliac spine to internal condyle 9 $\frac{1}{2}$ "; internal condyle to internal malleolus 8". Chest, expanded, 27". (Bibl. No. 605, p. 516.)

Fig. 678. *Charon, Degony and Tissot's Case.* I. 1, was given to drink, I. 2, was insane, II. 1 and II. 2, were well preserved septuagenarians, they had 12 children, of whom four, III. 2, died young, of trivial diseases. Another, III. 1, lived only two days and the last, III. 5, was stillborn. One of these six had congenital club-foot, but the account does not state which. Five others, III. 3, showed no peculiarity. III. 4, aged 41, was the eighth child and was imprisoned for murder. He had no education and was mentally deficient. He suffered from double asymmetrical micromelia of the lower extremities (micromélie abdominale double et asymétrique). His height was 134 cm. The R. leg was shorter than the L. Length of R. leg 41 cm., of L. 68 cm., measured from the antero-superior iliac spines, as apparently the great trochanter was absent on one side. There were various anomalies in the bones of the legs. The feet were broad and short, the toes separated from one another, "sont élargis en battant de cloche, le premier en retrait sur les autres, le cinquième presque aussi gros et sur le même plan transversal que le premier." The trunk was well formed but he had dorso-lumbar scoliosis. The upper limbs were in harmony with the trunk, the hand was not trident shaped. The penis was normal. He had monorchism. His measurements were: Height of trunk 50 cm. Distance from the pubis to vertex 76 cm.; from the pubis to the ground 58 cm.; from the jugular notch to the xiphoid appendix 27 cm.; from the jugular notch to the umbilicus 36 cm. Circumference of the thorax at nipples 87 cm.; of the abdomen at the umbilicus 75 cm. Maximum circumference of head 56 cm. Antero-posterior maximum diameter of head 18 cm. Maximum transverse diameter of head 15.5 cm. Cephalic index 86. Total length of upper limb 69 cm., humerus 29 cm., radius 24 cm., medius 10 cm.; R. lower limb (from antero-superior iliac spine) 41 cm., femur 20 cm., tibia 16 cm.; L. lower limb 68 cm., femur 29 cm., tibia 34 cm. (Bibl. No. 563, p. 390.)

Fig. 679. *Sinnetamby's Case.* This is a case from Ceylon. I. 1 and I. 2, were of average size and build, they had several children, all of whom were of normal size except II. 2, by name Podi Nona. She was a woman of diminutive size, aged 20; the upper half of her body, though small, was well proportioned, but the lower limbs were short, out of proportion to the rest of the body and afflicted with marked genu valgum. The pelvis though well formed was not calculated to permit the passage of the foetus—so Caesarian section was performed. The operation was successful, for II. 2 lived, but no statement is made as to whether the child lived. *Measurements* of II. 2. Height standing 52"; when sitting 29". Distance from crown of head to umbilicus 23"; from umbilicus to the sole of the foot 29"; from

jugal notch to symphysis pubis 19"; from occipital protuberance to tip of coccyx 26". Circumference of head 21". Inter-mastoid measurement across vertex 15½". Clavicle 5". Humerus (acromion to external condyle) 9". Radius 7½". Ulna 8¼". Wrist joint to tip of middle finger 6". Circumference of hand 7½". Length of thumb 2¼"; of index finger 3¼"; of ring finger 3¼"; of little finger 2¾". Circumference round crest of pelvis 25". Interspinous 9". Intercristal 9½". External conjugate 6¼". Length from antero-superior spine to knee 14"; antero-superior spine to internal malleolus 24"; great trochanter to sole of foot 24¾". Length of tibia 10"; of fibula 11¼"; of foot 8½"; of thorax 28"; of vertebral column from occiput to coccyx 29½". (Bibl. No. 504, p. 72.)

Fig. 680. *Branwell's Case*. No statement is made with regard to I. 1 and I. 2, except that they had 14 children, II. 1—2, of whom one died in infancy. II. 2, married II. 3, and had two children, III. 1—2. III. 1, aged 3½ years, and whose height was 29½", and weight 24½ lbs. She was brought to hospital for laryngeal diphtheria necessitating tracheotomy. There was a marked contrast between the length of the body and the limbs. The tip of the middle finger reached half-way between iliac crest and great trochanter. The head was very large, the forehead prominent, the bridge of the nose depressed, the space between the eyes normal. There was partial epicanthus. The chest was small and flat, the infra-sternal angle very large (120°), the abdomen large. When the hands were held loosely by the side or laid flat on the table the middle and ring fingers separated (trident shape). The hands were short and broad, the fingers short, broad near the base narrowing towards the tips (carrot-shaped). The general health was good. The mother said the child was backward compared with another child of hers, III. 2, who was two years younger. III. 1, was good-tempered and had a good memory for names and objects, apart from this, the mental power was not as well developed as in a normal child of that age. She was unable to speak properly. *Measurements*. Head: circumference 52 cm.; occipital protuberance to root of nose 35 cm.; auditory meatus to auditory meatus (over vertex) 36 cm. Trunk: chest circumference (through nipples) 45.5 cm.; circumference at abdomen (umbilicus) 52.5 cm.; occipital protuberance to tip of sacrum 36.5 cm. Upper limb: humerus 8 cm.; forearm 11 cm. Lower limb: external trochanter to external malleolus 26 cm. The arms could be raised to the side of the head but the elbows could not be fully extended. (Bibl. No. 483, p. 174.)

Fig. 681. *Cranke's Case*. I. 1 and I. 2, were Dutch Afrikanders of Griquatown, both normal. The account states they had five normal children older than II. 6, but does not say if they had younger children. II. 6, a boy aged 6, height 34", was sturdy and intelligent. The limbs were short at birth, the cranium was dome-shaped, and he had well-marked main-en-trident. (Bibl. No. 531, p. 11.)

Fig. 682. *Franchini and Zamari's Case*. II. 13, aged 35, was born at Cologne and a juggler by profession. His father, I. 1, was dead, cause unknown; he was a well-built man of strong constitution. I. 2, the mother, was alive and normal. She had had 13 children, of whom 12, II. 1—12, were dead. Two of these, II. 1—2, had died at birth, II. 1, of asphyxia, II. 2, of jaundice. The others died young of intercurrent diseases, all were normal. II. 13, born at term, was the 13th child. There was nothing remarkable in the ancestors or collaterals. II. 13, aged 35, was breast-fed, his weight was less than is usual at birth and he remained small and of frail constitution though he never had any serious illness. At the age of 15 his head began to increase in size, at 20 he had blennorrhagia and at 23 married II. 14. His height was 123 cm., he had a large head and short extremities and was a typical case of achondroplasia. His intelligence was above the average, he could read and write well. He had a malformation of the elbow (position antero-postérieure en extension complète avec un certain degré de rotation). The distal extremities of the metacarpals were much enlarged and the articular extremities of the ulna and radius much deformed. The latter descended lower than is usual and consequently the space corresponding to the fibro-cartilago was much diminished. The styloid apophysis of the ulna was much lengthened and developed and almost as thick at the point as at the base, that of the radius was not well defined. The epiphyses of the femur, tibia and fibula were also deformed. *Measurements*. Weight 50 kilos. Height 123 cm. Head measurements: maximum frontal circumference 61.5 cm. (?); fronto-occipital circumference 50.5 cm.; antero-posterior diameter 20 cm.; transverse diameter 16.5 cm. Cephalic index 82.5. Bi-orbital diameter 12.5 cm. Bi-malar diameter 12.3 cm. Circumference of thorax at nipples 81 cm.; abdomen at umbilicus 73 cm. Distance from jugular notch to pubis 49 cm., pubis to ground 44 cm. Upper limbs: acromion to epicondyle, R. 19 cm., L. 19 cm.; epicondyle to styloid apophysis of radius, R. 20 cm., L. 19 cm.; length of hand from interarticular line to tip of medius, R. 14.5 cm., L. 14 cm. Lower limbs: from antero-superior iliac spine to ground 55 cm.; from great trochanter to external malleolus 48 cm.; from great trochanter to external condyle of femur 24 cm.; from external condyle of femur to external malleolus 24 cm. Length of right foot from hinder edge of heel to point of great toe 19 cm.

His wife, II. 14, aged 33, from the Canton of St Gall, was 105 cm. in height with large head, flattened nose, trunk of normal length, very short limbs and trident-shaped hands. At the age of 20, she was 1 metre in height. She was very intelligent but refused to be examined. Her parents, I. 3 and I. 4, were alive and normal. II. 13 and II. 14, had one child, a girl, III. 1, born 1½ years after marriage delivered by Caesarian section and now aged 12. Her height was 80 cm. (70 cm. is given in another

¹ We have interchanged author's interspinous and intercrystal measurements.

place). She was breast-fed by mother, had large head, short limbs, was very intelligent and exactly like her parents. (Bibl. No. 644, p. 244.)

Fig. 683. *Schmidt's Case II.* (Jacob Hoepfner.) I. 1, I. 2, I. 3, and I. 4, were strong and of average height, as were also II. 2 and II. 3. II. 2 and II. 3, had eleven children, of these two III. 1—2 were dead (it does not say whether these two were normal or abnormal), eight, III. 8, were alive and of normal size. III. 5, aged about 65, was a dwarf and measured 126.2 cm. He was born with moustache and whiskers and had been a big strong child; at 6 years of age he had small-pox and measles, otherwise had been always healthy in early life. He thought that he had grown like other children for ten or twelve years and since then had grown no more. He maintained that the stoppage in his growth was due to too great physical exertion when a boy. From his 9th year he had carried heavy blocks of wood in a sawing mill and then he was a strong robust boy and took pleasure in carrying the largest blocks possible to beat the other boys. He had always remained healthy, with the exception of an attack of severe articular rheumatism about 10 years ago. Since then he had been sickly. At the age of 35 he married III. 6, then aged 27 and as small as himself; she had been delicate and suffered from disease of the chest (Brustkrank). They had one son, IV. 2, born a month too soon, who died in five days. He was not abnormally small for a premature birth. III. 5, had besides an illegitimate son, IV. 1, by a strong healthy girl, III. 4, and this boy was as big as other children. Given to strangers to take care of, he had been neglected and died in 20 weeks. Three years ago, III. 5 had been castrated; he said it was on account of a fall and that he had never had venereal disease. Since then he had become weaker. He was much troubled with "catarrh" of the respiratory organs, and suffered from a constant cough and want of breath. His mental faculties were normal. His dwarfishness was chiefly due to his short legs, his head was not stunted in growth, the trunk was more so. His whole appearance was agreeable, and the lack of proportion was not so noticeable, since the limbs considered alone had all parts in perfect proportion. Probably a case of achondroplasia. *Measurements.* Total length of body 126.2 cm. Length of head measured from the glabella to external occipital protuberance 184 mm.; from glabella to the most prominent point of the occiput, parallel with the German horizontal plane, 192 mm.; measured, without paying attention to the horizontal plane, from a point in the middle of a line joining the tubera frontalia to the external occipital protuberance 182 mm. Breadth of head 159 mm. Perpendicular length of spinal column 64.5 cm. Length of sternum 17.6 cm. Circumference of chest measured through nipples, average with quiet breathing 72.5 cm.; at abdomen 61.2 cm.; hips at crests 64.1 cm.; at trochanters 69.8 cm. Length of clavicle 15.0 cm.; humerus 24.2 cm.; ulna 20.0 cm.; radius 17.1 cm.; hand not given. Circumference of middle of upper arm 19.9 cm. Maximum circumference of forearm 20.3 cm. Length of femur 24.0 cm.; tibia 28.2 cm.; foot 20.5 cm.; lower limb from trochanter to external malleolus 51.5 cm. Circumference of middle of thigh 35.2 cm.; of calf 267 mm. (Bibl. No. 270, p. 63 and pp. 69—74.)

Fig. 684. *Schmidt's Case I.* (Sophie Petersen.) I. 1, I. 2, I. 3, and I. 4, were of average height. II. 2, was a healthy man of ordinary size. II. 3, was also of average size. She had scarlet fever and measles in youth, later she had violent puerperal fever (immature five months birth), in addition she had two difficult confinements, but the children were healthy. She had 12 pregnancies, III. 1—12. III. 1, was a healthy child at first, though the confinement was difficult, but in her 10th year she got spinal disease (Wirbelcaries) of which she died aged 15½. III. 2, a girl born after an easy confinement, died in nine days of "Lungenschlag." III. 3, miscarriage at 3½ months. III. 4, a son born after an easy confinement, was a weakly child; at the age of 1½ he was attacked by "paralysis of the spine with convulsive attacks," but got better in three years. Later he had scarlet fever and articular rheumatism, but at age of 22 was fairly healthy. III. 5, aged 18, was born after an easy confinement and was chlorotic. III. 6, a boy, an immature birth at 5½ months. III. 7, born after an easy confinement, died aged 18 months from "teething convulsions." III. 8, a girl born after an easy confinement, died aged 10 months of whooping cough and affection of the brain. III. 9, miscarriage at 3 months. III. 10, immature birth at 5 months. III. 12 was a miscarriage at 4 months. III. 11, aged 11½, was according to her mother born after a most difficult confinement. Immediately after birth the shortness of her upper arms and the prominence of the parietal protuberances were noticed, otherwise she was like other children. In her ninth month the forehead began to expand and the head was remarkably large; and at the same time a rickety rosary and posterior curvature (Ausbiegung nach hinten) of the spinal column when sitting appeared, but the latter symptom disappeared at the end of the second year. After the first year the epiphyses became enlarged. She had her first teeth at 5 months old. She spoke soon, but walked late and with great difficulty, and could not walk alone till she was 2½ years old. She had always been delicate and weakly, had measles at 3, slight whooping cough at 5 and severe abdominal typhus at 9. She scarcely grew at all in her first year the head excepted, but the cranium had not altered since her second year, she then grew slowly till her third year and stopped till her sixth year, since then she had grown half a foot (einen halben Fuss). Mentally she was perfectly normal, even above the average for her sphere of life. Her cranium was remarkably large, with the tubera frontalia and parietalia very prominent. It was evident she was rickety and macrocephalic. The shortness of the extremities, especially the upper extremities and in particular the humerus, was remarkable. The arms hung down like short fins. The epiphyses of all the

long bones were much enlarged. The muscular system was well developed, the fatty portions of the thighs and buttocks being greatly developed. The elbow joints on both sides could not be perfectly extended. The abdomen was much enlarged by meteorism. In spite of the smallness of her extremities, the girl used them cleverly, ran up and down stairs with great swiftness, and her little fingers moved quickly when working. *Measurements.* Total length of body 97.9 cm. Length of head from glabella to external occipital protuberance 165 mm.; from glabella to the most prominent point of the occiput, parallel with the German horizontal plane, 178 mm.; measured without paying attention to the horizontal plane, from a point in the middle of the line joining the tubera frontalia to the external occipital protuberance 184 mm. Breadth of head 172 mm. Perpendicular length of spinal column 46.5 cm. Length of sternum 9.5 cm. Circumference of chest measured over the nipples, average of quiet breathing 53.5 cm.; abdomen at umbilicus 56.7 cm.; hips at crests 52.7 cm.; at trochanters 65.6 cm. Length of clavicle 11.1 cm.; humerus 11.7 cm.; ulna 11.9 cm.; radius 10.2 cm.; hand from end of radius to end of middle finger 11.9 cm.; hand from end of radius to beginning of first phalanx of middle finger 5.1 cm.; whole upper limb from acromion to end of the middle finger 31.1 cm. Circumference of middle of upper arm 17.9 cm. Maximum circumference of forearm 18.7 cm. Length of femur 19.7 cm.; tibia 17.6 cm.; foot 13.9 cm.; lower limb from trochanter to external malleolus 36.4 cm. Circumference of middle of thigh 39.5 cm.; calf 26.7 cm. (Bibl. No. 270, p. 62 and pp. 69-74.)

Fig. 685. *Porak's Case I.* No statement is made with regard to I. 1 and I. 2, but I. 2 must have been normal as Porak saw her. She had had seven children, II. 1-7, the first at the age of 19, all the pregnancies had terminated at term except the fourth, II. 4, who was born at eight months, this child was alive and so were all the others except two. I. 2, was aged 30 when II. 7 was born. She came to the Hospital for her confinement, and the child, a female, who weighed 1900 gms., was born dead and achondroplastic. The shortness and curvature of the limbs and the exaggerated development of the head and the part of the body above the umbilicus were very noticeable. The nose was flattened, the neck very large. The skin on the upper limbs was thicker than usual. The thighs were abducted and considerably curved, the legs were flexed on the thighs with considerable external curvature. The feet were in pronounced equino-varus position, which was however more apparent than real. The scapulae showed some abnormalities. The humeri, ulnae and radii were curved. The femora had considerable external curvature. The fibulae were only slightly ossified and the epiphyses of the long bones of the lower limbs were not ossified. *Measurements.* Head, occipito-frontal diameter 10 cm.; mento-occipital diameter 11 cm.; bi-parietal diameter 8 cm.; bi-temporal diameter 7 cm.; sub-occipito-bregmatic diameter 8 cm.; length of body 30 cm.; from vertex of head to umbilicus 20 cm.; umbilicus to soles of feet 16 cm.; upper limbs 13 cm.; clavicle 3.3 cm.; humerus 4.1 cm.; ulna 3.8 cm.; radius, 3.0 cm.; fibula, 1.5 cm.; tibia, internal face 2.7 cm.; tibia, external face 3.7 cm. (Bibl. No. 247, p. 560.)

Fig. 686. *Eckstein's Case I.* I. 1, had diabetes. I. 2, was healthy. They had 12 children, II. 1-4; nine children, II. 1, were healthy. Two sons, II. 2-3, had died, one aged 17 and the other 27, both had from birth symptoms of the same disease as II. 4. II. 4, aged 9, was 82 cm. in height. Her face was well formed, the nose slightly depressed, and the teeth peculiar. The incisors showed no edges (Kanten), but were pointed like the canines. Moderate bi-lateral keratitis existed, yet vision was almost normal. The thorax was much depressed; she had kyphosis and a prominent abdomen. Her extremities appeared shorter than normal, but the impression disappeared when one looked at the shortening of the trunk in consequence of spinal weakness. It was only when the body was straightened that the shortness of the extremities was noticeable. The flexibility of the wrists was very noticeable. She had genu valgum. (Bibl. No. 608, p. 1072.)

Fig. 687. *Spicer's Case.* II. 5, was sent to Spicer on account of mouth-breathing and panting of an exaggerated type. Its height was 35". No measurements are given, but there was distinct shortening of the lower limbs with normal development of the trunk and main-en-trident. Many of the family had post-nasal adenoid hyperplasia. The eldest sister, II. 1, had a high vaulted palate, superior protrusion and had lost the upper front incisors at age of 21. The elder brother, II. 2, aged 20, height 6' 2½", had hands and feet of the acromegalic type, with vaulted palate and superior protrusion. He had lost the upper front incisors. The second sister, II. 3, had the thyroid gland enlarged. The second brother, II. 4, had tonsils and adenoids removed for obstruction and mouth-breathing. I. 2, the mother, and I. 1, the maternal aunt, had distinct acromegalic characters of nose, cheek-bones, lower jaw and lower lip. In short the morbid states of this family were chiefly those associated with pathological states of the bony cranial basis or the immediately overlying pituitary body or the subjacent Luschka's tonsil. (Bibl. No. 551, p. 57.)

Fig. 688. *Taylor's Case.* No statement is made with regard to I. 1 and I. 2. II. 2, was the seventh child, II. 1 being normal. It had a large head and short limbs. The trunk was comparatively normal, but there was a disproportion between the upper and forearm, the upper arm being very short. The hands were short and broad like those described by Marie, and it was enormously heavy compared to ordinary children of the same age. (Bibl. No. 434, p. 162.)

SECTION II. ATELEIOSIS.

PLATE LIV. Fig. 689. *Schmolck's Case*. Schmolck writes :—"During my Alpine tour this year, I came by chance upon a narrow very lonely valley, little frequented by tourists, named Samnauntal, one of the lower valleys of the Inntal. A short stretch northwards from Finstermünz, we came upon a somewhat rough way, impassable for vehicles, which branched off westwards from the Inntal. The eastern half of the valley belongs to the Tyrol, the western to Switzerland. The valley has six 'Ortschaften' which lie at a level of from 1500 to 1800 metres, and have 356 inhabitants altogether. Among them I found seven dwarfs, whom I photographed. A thorough physical examination, without clothes, could not be made. But in any case such examination could have been of no value, since no Röntgen photograph could be made and the pictures of the bones are of the first importance. I can therefore only give a quite superficial description of individual dwarfs, but I believe that these as well as a description of their origin will be of interest. I have made very careful inquiries concerning the latter. Until 1873 there had never been such cases among the inhabitants of the valley and no cretinism or goitre. These dwarfs were all descended from a brother and sister who lived in the valley at the beginning of last century and were mentally and physically perfectly normal, Christian Prinz and Marie Prinz. Marie Prinz, I. 1, married Nikolaus Jenal, I. 2, and had six normal children. Only the descendants of II. 3, a normal daughter, are given. She married Vincenz Messner, II. 4, and had three normal daughters. Of these, III. 2, Therese, married III. 1, normal, and had 10 normal children, IV. 1—10. III. 4, Aloisia, married III. 3, Josef Jenal, and had six normal children, IV. 11—16, and two dwarfs, IV. 17—18. III. 6, Jakoba, married III. 5, Florian Kleinstein, normal, and had five normal children, IV. 19—23, and three dwarfs, IV. 24—26. Christian Prinz, I. 3, married Marie Jenal, of Samnauntal, I. 4, and had six normal children. Of these, II. 8 married Pauline Willner, of Samnauntal, II. 9, and had four normal children, III. 7—10, several, III. 11, with obvious dwarf growth who died young, and III. 12, a dwarf still living. II. 14, Eduard Prinz, married II. 15, Josefa Jenal, of Samnauntal, and had two normal children, III. 13—14, and two dwarfs, III. 15—16. IV. 17, Suzanne Jenal, aged 30, height 108 cm. (see Plate BB (46), when aged 28), lives in the village of Raweisth, where she acts as housekeeper to her father who is village innkeeper. Her demeanour is somewhat foolish, but more marked defects of intelligence are not to be observed. The cranium is very large, the bridge of the nose is broad and depressed, the eyes are wide apart, the skin of the face is wrinkled, the neck very short. There is no goitre. The limbs are well proportioned and their movements adroit. IV. 18, whose sex is not stated, was born 30 years ago and died, aged 29. IV. 24, Julius Kleinstein, aged 30, height in shoes, 108 cm., has a large quadrate skull, somewhat bulging forehead, depressed bridge of the nose, slight growth of hair on upper lip, short neck and skin of face wrinkled. He has no goitre and a deep and somewhat peculiar voice. His limbs are well proportioned, and his movements animated and adroit. He is of average intelligence and friendly disposition. He is an independent tailor in the village of Plan and lives with his mother and two dwarf sisters. IV. 25, Marie Kleinstein, aged 26, height 93 cm. She has a very large angular skull, bulging forehead, depressed bridge of nose and a very short neck with wrinkled skin. She has no goitre. Her movements are very quick and adroit. She had done well at school and no defect of intelligence is to be observed. She occupies herself with needlework, as she is too weak for work in the village inn which her mother carries on. IV. 26, Julie Kleinstein, aged 14, height 86 cm., has exactly the same appearance as IV. 25, but the cranium is relatively even larger than in the latter. She is still at school and doing very well indeed (Plate BB (47) is a good photograph of the three Kleinsteins). III. 12, Josefa Prinz, in Compstock, aged 26, height 109 cm. in her shoes, has well-formed limbs. Her movements are quick, animated and accurate. She is of a friendly disposition and has a pleasant expression. The shape of her head is not in the least peculiar. The thyroid is not enlarged. She sings well but her voice is child-like. Her intelligence is obviously quite normal. She follows the occupation of a dressmaker, by which she supports herself and her mother and is considered a very capable "fashionable" tailoress. She has her clientele in Munich, Innsbruck, Bozen and St Moritz. By her side in the portrait is her mother, aged 70 (see Plate BB (44)). III. 15, Rudolf Prinz, aged 24, height 104 cm. in his shoes, without shoes scarcely 100 cm., has a quadrate shaped head. The parietal eminences are very prominent, the transverse measurements between the parietal eminences very great. The bridge of the nose is depressed. He has a small moustache, and a childlike, rather squeaky voice. The skin of the face is wrinkled. He has no goitre, his intelligence is not defective, his movements are animated and accurate. III. 16, Ulrich Prinz, aged 22, is of exactly the same height and similar personality, but has no trace of a moustache. He has learned tailoring but does not follow it as a trade, as there are already tailors enough in the district. Both these dwarfs live in the village of Laret, in the house of their well-to-do father. Their eldest brother stands besides them in the picture. (See Plate BB (45).) As to the nature of these instances of dwarf growth, one can naturally say nothing definite without accurate X-ray investigations. But if one considers the complete symmetry and proportion in build present in all these dwarfs, the absence of all curvature and shortening of bones, the lack of defect of intelligence

and so forth, one may well believe that they belong to the so-called 'real dwarfs' (echte Zwerge). As is well known, disturbance of bone growth may arise from defective function of the thyroid gland. How that is also concerned here cannot be said for certain, since abnormalities in the condition of the thyroid gland in these dwarfs were not observed on external examination. An anomaly of the thyroid gland, which is so common in high lying and secluded mountain valleys and leads to cretinism and goitre, is not thereby excluded here: but it must have remained confined to a single family, since there is neither cretinism nor goitre amongst the remaining inhabitants of the valley. All these are well formed people, who by agriculture and grazing live in moderate prosperity under very favourable hygienic conditions. In considering the appearance of dwarf growth in the Prinz family, one must take into account, besides geographical position, the many marriages which have been contracted between blood relations living in the same valley. In the Prinz family the surnames recur continually. Although the Catholic male inhabitants of the valley fairly often marry Tyrolese women from the neighbouring Inntal, marriages with the inhabitants of the neighbouring Unter-Engadin do not occur, on account of the Protestant faith of the latter, and as a result marriages between the few inhabitants of the Samnauntal are contracted. It is worthy of note that the Samnauntalers themselves now strictly shun any marriage alliance with the normal members of the dwarf family. They even express fear, lest their whole community should degenerate into dwarfs. It should be considered further that the cretinoid type of face, very obviously recognisable in many illustrations of dwarfs of normal intelligence, is not uncommon (see *Virchow's Archiv*, Bd. 94), and that this is to be referred to premature ossification and union of the basilar synchondrosis. The bones of the face remain small in consequence; the cranium, in contrast to it, appears to be enlarged, and it has, in compensation, really grown to excess. In the descendants of Marie Prinz the cretinoid formation of the face is very obvious, in those of Christian Prinz only slightly so, not being present at all in the case of Josefa Prinz. I have also seen misplaced teeth and persistent milk teeth (as seems to be common in cretins) in single individuals of these dwarfs. On the other hand I have, even after prolonged inquiry, found no noticeable defect of the intelligence in any of these dwarfs, at the most single individuals appeared somewhat childish and too little independent in disposition'. (Bibl. No. 538, p. 105. The photographs reproduced were most kindly sent to K. Pearson by Dr Schmolck.)

Fig. 690. *Rischbieth's Case* (Magri Family). The account of this family is given by III. 11, Ernesto Magri, known as "Baron" Magri, now aged 62 years. I. 1, his paternal grandmother, was "a little woman," of stature about 4' 6", but she showed none of the peculiarities seen in his dwarf brother and sister. II. 1 and 2, his parents, were of ordinary height. He knows nothing of their brethren, nor of his maternal grandparents. Of his own brethren, III. 1, 2, 3, 4, 5, 6, 7, 8 and 10 were of ordinary stature. III. 1, died aged 85 years. Of the others some are still alive and others are dead. He is uncertain of his facts about them and knows nothing about their descendants if any. The other two of his brethren, III. 9 and 13, were dwarfs like himself. III. 9, died aged 32 years. His brother III. 13 is still living. He himself married a woman of ordinary size. By her he had three children, two sons and one daughter, IV. 1, 2 and 3. Of his sons' descendants, if any, he knows nothing. But his daughter, IV. 3, married a man of ordinary size and has had two children of ordinary size and growth, but died during her second confinement. III. 13, Primo Magri, is now aged 60 years. Married to III. 14 (*née* Lavinia Warren or "Mrs Tom Thumb"), late in life, after the menopause, a female dwarf of his own height, now aged 67 years. She had a sister, III. 16, of her own size and type. Nothing is known of their parents or collaterals. III. 14, was formerly married to III. 15, Charles Stratton, "Tom Thumb"² (see Plate AA (43)). It is said that there was a child of ordinary size and growth, IV. 5, born of this union, but that it died in infancy. Of the parents or collateral relations or brethren of III. 15, nothing is known. But he himself was of markedly infantile appearance. He had a double row of teeth all round, the milk dentition having persisted, as well as the permanent set. In general he resembled Schaaffhausen's dwarf (see Bibl. 130 and our p. 388). He died aged 53 years. III. 11, Ernesto Magri, aged 62 years, music hall artist (see Plate CC (48)). Height 3' 9". Fairly strong moustache. Appearance infantile. Frontal and parietal bosses prominent. Bridge of nose slightly depressed, but not broadened or flattened; nose not tip-tilted. Skin normal. Hair of scalp thick and soft and beginning to grow grey (contrast Schaaffhausen's dwarf). All teeth present, normal. No persistence of milk dentition. Voice squeaky, childlike. The limbs show no curvatures and no shortening. Proportionally to trunk and head the length seems to be that of an ordinary adult, and the segments show this relationship to one another. The hands are not spatulate, but they are like those of an infant grown old, being broad and thick with relatively broad, thick and short fingers, as in the infant. The nails are set somewhat at an angle to the line of the fingers instead of in their plane. Nothing like a main-en-trident. Colour of face somewhat "waxy" and yellowish; looks much like that of pernicious

[¹ The pedigree seems to indicate that true dwarfism might be recessive in a stock ancestral to both Prinz and Jenal families. A good piece of work might be done by a summer spent in the Samnauntal looking up the full pedigree in the church registers. Editor.]

² The account of "Tom Thumb" is taken from Hastings Gilford, see Bibl. No. 408.

anaemia. (This feature is, however, much more obvious in his brother and his sister-in-law, III. 13 and 14, who have the colour of wax models in a show.) He is a very intelligent man. He writes a clear hand showing considerable character and though a foreigner writes English idiomatically and speaks it almost without an accent. His manner is that of an adult. He seems of somewhat timid disposition. III. 13, Primo Magri, known as "Count" Magri, aged 60 years, music hall artist. Resembles his brother in height and other particulars almost exactly but has no hair about the face, and the infantile appearance is more marked. *Note.* III. 11, 13 and 14 are, as nearly as possible, of the same height and proportions (3' 9"). The "wax-like" complexion is more marked in 13 and 14 than in 11. In all three the teeth are still present and normal. None of these three individuals have any resemblance to cretinism, myxoedema, achondroplasia, rickets, or other of the more usual varieties of dwarf growth. No family history of syphilis, alcoholism, tuberculosis, in the Magri family could be obtained. None of these have taken thyroid extract. Unfortunately no physical examination, measurements or radiograms could be made of these dwarfs and though they look "anaemic" no blood examination could be made. An account of Mrs Tom Thumb is given by Gould and Pyle (see Bibl. No. 332) and by Hastings Gilford (see Bibl. No. 403). We owe a new photograph of Baron Magri taken especially for this work to his kindness: see Plate CC (48) and also Plate AA (43). A photograph of "Le comte, la comtesse, le Baron M..." is given in *Le Bulletin médical*, 23^e Année, p. 961.

[The earliest accounts of the Magri family are due to Veratti Verardini and Taruffi and as the two latter give an earlier and in some respects a fuller account of the family, abstracts are included here. Taruffi says that "The Magri family" were natives of the province of Ferrara. I. 1 and I. 2, were robust and of a good height. They had thirteen children (Rischbieth gives only twelve) of whom eight survived. Of these eight, three were dwarfs, III. 9, III. 11 and III. 13, and five were normal. III. 9, the seventh child, was a perfectly symmetrical dwarf. At the age of 19 she had not menstruated, her height was 102 cm., she weighed 45 pounds (libbre) and had considerable discernment. In 1865, at the age of 27, she was exhibited before the Medical Society of Bologna and then measured 105 cm. and weighed 21 kilos. The circumference of her head was 48 cm. and the distance from the top of the head to the chin 52 cm. (dal sincipite al mento). She died aged 33 of angina diphtherica and her height was then 110 cm. Ernesto was the 12th child. He was also well formed, with the exception of his head which was rather large. He had an active mind and aggressive character. At the age of 11 in 1858 he was 89.0 cm. in height, at 18 in 1865, 104 cm. The circumference of his head was 53 cm., and the distance of the top of the head from the chin 57 cm. He weighed 19 kilos. With his arms perpendicular the wrists (carpi) reached the trochanters. He had no hair on his face and little on the pubis, the testicles were but slightly developed and frequently withdrawn into the inguinal canal. At the age of 26 he married III. 12, a girl 156 cm. in height. They had two children; the first was a son who in 1878 was aged 4, and was 95 cm. in height and well developed. The second, a daughter, born 1876, was well formed at 15 months old, and 60 cm. in height, that is 12 cm. below normal, so probably she would be a dwarf (according to Rischbieth she was the *third* child and *not* a dwarf). Ernesto in 1877 was aged 30 and was 110 cm. in height. Primo was the 13th and last child (according to Rischbieth the 12th child). At 8 years of age he had well-formed limbs and measured 82 cm. In 1865, when 15 years of age, he was 91 cm. high, the circumference of his head was 48 cm., and the distance from the top of the head to the chin 53 cm. With hanging arms his wrists reached the great trochanters. The testicles were small and partly concealed in the inguinal canal; there was no hair on the pubis. He weighed 14 kilos. He was sharp and intelligent. At the age of 28 he measured 109 cm. (Bibl. No. 248, p. 446.) Verardini also gives (Bibl. No. 133^b) the report of a medical commission on the Magri family, 1865. Primo Magri aged 15, Ernesto aged 18, Amalia aged 27. All had a slight degree of abnormality in the conformation of the head, otherwise they were harmoniously proportioned, they were intelligent but had not the mental power of their age and seemed more like children.

	Amalia	Primo	Ernesto
Horizontal circumference ...	48 cm.	48 cm.	53 cm.
Vertex to chin ...	52 "	53 "	57 "
Sagittal circumference ...	45 "	45 "	47 "
Thoracic circumference under axillae	61 "	53 "	58 "
" " at nipples ...	57 "	54 "	60 "
Pelvic circumference ...	68 "	56 "	60 "
Bi-acromial diameter ...	26 "	23 "	26 "
Bi-iliac distance ...	25 "	24 "	23 "
Stature ...	105 "	91 "	104 "
Weight ...	21 kilos.	14 "	19 "

Amalia menstruated regularly. Ernesto had little hair on face or pubes, and Primo less. In the case of these brothers the testicles were largely in the inguinal canal. These facts were ascertained from the doctor to the family, Giuseppe Veratti. EDITOR.]

Fig. 691. *Rischbieth's Case*. Adolf Gehrler from Innsbruck, Tyrol. II. 1, was an only child. His parents and all their known relations were of ordinary size. II. 2, and her only brother II. 3, were of ordinary size, as were their parents and all known relations of these. Of the children of II. 1 and 2, there were six; of these, III. 1, 2, 3, 4 and 6, were of ordinary size. All known descendants of these are also of ordinary size. III. 5, however, is a dwarf now aged 30 years. No measurements, radiographic examination or physical examination were permitted, so that the account is so incomplete as to be almost valueless. His height¹ is approximately 3' 6". He has the proportions, facial expression, and general appearance of a very small man, and not that of a child, as is usual in most dwarfs of his kind. There is a fairly strong moustache. The bridge of the nose is not depressed or broadened. The nose is not tip-tilted. The frontal and parietal eminences are not markedly prominent and the cranium, when compared with the face, is not proportionally larger than in the ordinary adult. The teeth are all present and normal. The skin is not rough, nor dry, but perfectly normal. The hair of the scalp is neither thin, nor dry, nor brittle. The hands show no difference from those of an ordinary adult except smallness in size (i.e. they are not spatulate, show no main-en-trident or other peculiarity in the shape of the segments of the fingers; the shape and mode of insertion of the nails are in no way peculiar). Their size is in the usual proportion for an adult to the other segments of the limbs, the trunk and the head. The limbs show no curvatures. They are rather thin but otherwise fairly well formed. Their length both in the proportion of one segment to another and of the whole to the trunk and head is that of the ordinary adult. The complexion as in all dwarfs of this variety is "waxy" and yellow and would suggest, almost exactly, that of pernicious anaemia if seen in other individuals. No examination of the blood being permitted it was not possible to determine whether anaemia was present or not, but apart from his colour, which is that of disease, this individual has no symptoms and feels in good health. The voice has the timbre of an adult male, though somewhat squeaky and high pitched probably owing to the smallness of the chest and consequently defective phonation. The intelligence is good. He answers questions quickly and clearly, can read, and writes a clear well formed hand. All movements are of the average celerity and precision. He seems to be in no way lacking in independence. No information as to sexual characters could be obtained. This dwarf has not the least resemblance in any way to that dwarf growth seen in cretinism or infantile myxoedema, or that of achondroplasia. No family history of syphilis, alcohol, tuberculosis, or other known cause of dwarf growth could be obtained. No descendants. No history of collaterals obtainable.

Another German dwarf, resembling the above in height, growth of hair about the face, shape of head and of hands, colour of face and general appearance (namely that of a very small man rather than of a child as is the usual condition), is also known to me. Like the above the pedigree is negative and it has not been considered worth recording. These two individuals, however, are mentioned here because they present features pointed out above not usual in this condition known as "true dwarf growth," "echten Zwergwuchs" or "nanisme vrai." Thus of some 20 male dwarfs of this variety over 20 years of age that I have seen, only three showed any growth of hair about the face—the above two and E. Magri whose photograph is shown—(see Fig. 690). The last, however, in the shape of cranium, with its prominent frontal and parietal bosses, is more like the usual type, as also is his voice character, etc.

Fig. 692. *Jacobsen's Case*. In generations I. and II. all known individuals were of normal growth. II. 7, height 4' 10", is now dead (should not II. 7 be noted as a semi-dwarf). She had three brothers and two sisters, all of average stature, all married, and all having children of average growth. The number of these is not stated. She had one sister, II. 6, of average stature, unmarried. II. 7, was aged 24 or 25 years when she married II. 8, a well developed man of 5' 4". There were three children of this marriage, III. 6, 7 and 8, all dwarfs. III. 6, aged 14½ years; height 3' 11". Generally dwarfed. No pubic or axillary hairs. Backward in every way except mentally. Ideas rather childish but very intelligent. Passed the sixth standard at the age of 13½ years. "Had something wrong with his left ankle, when younger, which necessitated his spending three years in a hospital." III. 7, aged 13 years. Height 3' 8½". No signs of puberty and has never menstruated. Slight genu valgum. Mentally acute. Has passed the fourth standard. III. 8, aged 11 years. Height 3' 0¼". Very puny and delicate. Has to be kept from school in the winter months. Mentally acute. Slight genu valgum. III. 6, 7 and 8, were all born at full term and no comment was made at birth as to their size. Had not grown for two years at least before observation. When seen all had large heads and weak limbs, but the latter were in normal proportion to their height (i.e. there was no micromelia). II. 9, is the second wife of II. 8, and is of about the same height as was II. 7. She has two children, III. 9 and 10. III. 9, is aged 8 years. Height 3' 8½", i.e. this is as great as that of III. 2, aged 13 years, the second child of the first wife. III. 10, is aged 4 years. Height 3' 4", or 3¼" greater than that of III. 8, aged 11 years, the third child of the first wife.

¹ This had to be inferred by comparison with surrounding objects such as tables.

III. 9 and 10, are growing yearly, whereas the dwarfs have not grown for the last two years. II. 10, was the first husband of II. 9, the second wife of II. 8. By him there was one child, III. 11, aged 14 years. Height 5' 2", or 15" taller than III. 6, the dwarf boy, though she is 6 months younger than he. She has axillary and pubic hairs and mammae and has menstruated regularly for 3 months. (See Bibl. No. 265.)

Fig. 693. *Boruwaski Family*. The account of this family is taken from the Memoirs of Josef Boruwaski, II. 4, and from the edition published in 1792. He says "I was born in the environs of Chaliez, capital of Pokucia in Russian Poland, November, 1739. My parents were of average height, they had six children, five boys and a girl, three of these children reached a height above the average, whilst I and two others remained of less stature than ordinary children of 4 to 5 years old. What seems equally remarkable is that this difference in height alternated in our births, I insist upon this point because it is singular and to correct an error in the *Encyclopædia*." II. 1, the eldest brother, aged about 60 when Boruwaski wrote, was nearly 3" taller than II. 4. He always enjoyed robust health and lived with a Russian lady who found he had enough capacity to be entrusted with the management and direction of her affairs. II. 2, the second brother, was of weak and delicate constitution, he died aged 26, being then 5' 6" in height. II. 6, was 7 years younger than II. 4, she died aged 22 of small-pox and was then only 26" high. Boruwaski says that she could easily walk under his arm, and that she had a lovely face and was so beautifully proportioned that a sculptor could find nothing to criticize. The heights of II. 4 at different ages are given in English measure; he continued to grow till he was 30 years of age, and was then 3' 3" in height. His brother, II. 1, also continued to grow till he was 30. Boruwaski was very intelligent, he is described in the *Encyclopédie* article "Nains," from which an extract is given in the preface of the "Memoirs" as having "a figure well-formed, head well-proportioned, fine eyes, gentle expression, knees and feet all in proportion." He lived for many years with the Countess Humieska and left her because she refused to sanction his marriage with a protégée of hers who lived with her as companion. He married this lady, II. 3, later. They travelled about a great deal, apparently living on what he got from the Royal Princes and Nobles who entertained him. He mentions the birth of his first child, III. 1, a daughter, in his memoirs, but the Preface states that at the age of 53 he had four children, the eldest aged 11. The latter part of his life was spent in England at Durham where he died, aged 98. There is a statue of him by Bonomi in the Museum of Durham University (see Plate II (67) and (68)), there are several portraits of him in existence. See Iconography, 144^a—6^b, 163, 165. (Bibl. Nos. 43 and 47.)

Fig. 694. *Neumann's Case*. No details of the parents or collaterals of I. 1 or I. 2. I. 1, Christian Goerke, aged 54 years, "Eigenkothner," in the village of Gross Skionsken, in the Strassburg region of West Prussia. Height 5' 6" (Prussian measure). I. 2, wife of I. 1; aged 58 years. Height 4' 11" (Prussian measure). "Thus this married pair show nothing remarkable in their stature, which is neither very great nor very small." They have had six children, II. 1 to II. 6. II. 1, died aged 1 year. It was of ordinary proportions for age. II. 2, aged 30 years. Of average height for a woman, somewhat over 5' (Prussian measure). II. 3, Christine, aged 26 years, height 3' 6". II. 4, aged 24 years, height 3' 8". II. 5, Johann, aged 21 years, height 3' 10". II. 6, Jakob, aged 18 years, height 3' 4". "Thus these four individuals have the height of children of the age of 5 or 6 years, and such an age their bodily proportions suggest. Their heads are in proportion to the rest of the body. The faces are those of children, and indeed of very well-formed and for the most part charming children. Neither of the males show any growth of hair about the face. The breasts of the females are undeveloped. Their external genitals are infantile, as are those of the males, and show no growth of hair. No menstruation or other sex characteristics have been observed by the parents in any of these children. Wisdom teeth lacking in all. In II. 6 the second molar teeth are also lacking. Their strength corresponds to their childlike proportions and is so feeble that they can only perform such muscular work as any child of 5 or 6 years of age would be capable of performing. Their mental qualities have, however, in no way remained undeveloped as their physical qualities have done, and are in every way much more accurately expressive of their real age. They are, for this reason, welcomed by their larger fellows of their own age, and abstain from all purely childish amusements and occupations." (See Bibl. No. 84, p. 705.)

Fig. 695. *Levi's Case II*. III. 8, Domenico Gazzano, aged 33, was born at Garescio, province of Cuneo, Piedmont. His height was 111 cm. and his weight 23 kilogs. His father, II. 2, was very strong and normally intelligent, but very small; III. 8, said II. 2 was exactly the same height as himself and had the same malformation of the nose and the last phalanges of the fingers. His mother, II. 3, and all his grandparents, I. 1—4, were normal. II. 2 and II. 3, had eight children, III. 1—8, of whom two, III. 6—7, were twins, who died aged 3, and the five other brothers, III. 1—5, were normal. II. 8, was normal at birth, and in early years developed normally. He learnt to read and write. His growth stopped between 8 and 10 years of age, but otherwise he developed normally. At 15 he was sexually adult, and had sexual intercourse at 16. Five years ago he had married

III. 9, a normal woman of medium height. She had a miscarriage, IV. 1, at five months. A second pregnancy resulted in a healthy girl, IV. 2, aged nearly 2 years, who exactly resembles her father; there was a second girl, IV. 3, aged 6 months, apparently normal, who was not seen. For some years Domenico had taken to drink, otherwise he led a regular life. He was perfectly proportioned and completely developed. His nose was similar to that of Magro Santo (see Pedigree 742), tip-tilted and with wide nostrils. He had bilateral inguinal hernia. The genital organs were those of an adult, the limbs normally proportioned, and the last phalanges of the fingers malformed. The measurements were: Height of pubis from ground 55 cm. Maximum thoracic circumference 68 cm. Maximum abdominal circumference 62.5 cm. Length of sternum 13 cm. From acromion to tip of medius 48 cm. Acromion to tip of olecranon 18.5 cm. Tip of olecranon to radial epiphysis 17 cm. Maximum length of hand 12.5 cm. Length from antero-superior iliac spine to heel 64 cm. Great trochanter to inter-articular cleft of knee 26 cm.; this point to external malleolus 28 cm. Maximum length of foot 17 cm. Maximum circumference of cranium 48 cm. Maximum bi-parietal diameter 170 mm. Bi-temporal diameter 143 mm. Bi-zygomatic diameter 120 mm. Cephalic index 85. IV. 2, Alessandrina Gazzano, aged 22 months, was born at term. She was very small at birth and only weighed 2 kilograms. She was always smaller than children of her age, was very lively and intelligent, had eight teeth, could walk alone and was well proportioned. The measurements were: maximum thoracic circumference 36.5 cm. Maximum abdominal circumference 35 cm. Length of sternum 7 cm. Height of pubis from ground 24 cm. Total length of upper limb 24 cm. (? 24.5). Length of upper arm 10.5 cm. Fore-arm 8 cm. Hand 6 cm. Total length of lower limb from antero-superior iliac spine to heel 26.5 cm. Length of thigh 13 cm.; of leg 11.5 cm.; of foot 8.5 cm. Maximum circumference of cranium 43.3 cm. Bi-parietal diameter 150 mm. Bi-temporal diameter 120 mm. Cephalic Index 80. (Bibl. No 640, p. 534.)

Fig. 696. *Rischbieth's Case*. The account of this family is given by III. 1. He is perfectly clear as to the number of his brethren, and their order of birth and of his parents and their brethren as shown. But he knows nothing about the descendants, if any, of any of the latter. He knows all the individuals shown in generation I., but nothing of their brethren, if any, or descendants of these, if any. His brother, III. 4, agreed with his statements, after discussion and suggested amendments. All the members shown of generations I. and II. are still living and are of ordinary size. III. 2, 3, 5, 6 and 7 are of ordinary size for their age, at least not small like himself and his brother. III. 1, Heinrich Glauer, aged 24 years. Height between 3' and 3' 6". He had the general appearance of a child of about 4 years of age, but his face, in a vague way, looks much older. No hair about the face. Expression childish. Face yellowish, waxy looking. Suggestion of pernicious anaemia. Skin normal. Not dry nor thickened. Hair of the scalp not thin and in no way abnormal. Frontal and parietal bosses not very prominent. Bridge of nose not depressed, broadened or flattened. All teeth except third molars present, sound. Voice squeaky, infantile. The limbs show no curvatures; they are somewhat massive, but the muscles are rounded, as of a child, rather than prominent as of a muscular man. The limbs show no shortening, of segments or as a whole. The hands are not spatulate nor "en trident"; they are those, as it were, of an infant grown old; short, broad and thick, with short and thick fingers, but these differ in length from one another as in the ordinary infant or adult and show no approximation to equality as in the achondroplastic. Manner somewhat childish, but it is difficult to be sure to how great an extent this is due to surroundings (those of a "show" dwarf who is usually treated either as a child or a curiosity). Intelligence good for his age (24 years); he is particularly quick and definite in his answers to questions, and took an intelligent interest in the formation of his "Stammbaum," as he described it. He can read well and writes a well-formed hand. Active and quick in all movements. The general intelligence of this dwarf would appear to be about that of the average of small shopkeepers or innkeepers. III. 4, Bruno Glauer, brother of the last, aged 20 years. He presents all the features shown by his brother, but is smaller and looks younger. His stature is approximately 3' and he presents the general appearance of a child of about three years of age. On a more careful examination, however, his face gives the impression of a very much greater age, which might be almost anything from 12 to 25 years. He has the same "thick-set" appearance as his brother, and the description of the latter would, with the above exceptions, also apply to him. He is quite intelligent and quick and can read and write well. But his manner is childish. Most dwarfs of this variety are markedly infantile in their facial aspect; but in the case of these two it is more accurate to say that this is childish. Neither of these two know at what period of their lives they ceased to grow, never having been told. The above account is probably of little value, for no physical examination, measurements, nor radiograms were permitted. Hence even their heights had to be roughly inferred from a comparison with surrounding objects such as tables. Again, they look anaemic, but no examination of the blood was permitted. They have no real resemblance to cretinism, infantile myxoedema, achondroplasia or other common varieties of dwarf growth, and are markedly intelligent. There is no history of syphilis, alcoholism, tuberculosis or rickets in the family. They have never taken thyroid extract and never suffer from general ill-health. Photographs of these two dwarfs in their native dress are given on Plate CC (50). (Unpublished.)

Fig. 697. *Gould and Pyle's Case*. (The Rossow brothers.) II. 1, Franz Rossow, aged 20 years,

height 21", weight 24 lbs.; II. 2, Carl Rossow, aged 18 years, height 29", weight less than that of his brother; they are the two eldest of 16 children, and clever gymnasts. No note of I. 1 or 2 or of any collaterals or ancestors. See Plate AA (43). (Bibl. No. 332'.)

Fig. 698. *Virey's Case I.* I. 1, was 5 "pieds" 5 "pouces" in height. The height of I. 2 was 5 "pieds." They were Germans. Virey examined their daughter, II. 2, in 1818. She was aged 8 or 9 years and was only 18 "pouces" in height. She was active and bright with the intelligence of a child of 3 or 4 years old. She began to get her teeth at age of 2 and only began to walk and speak at 4. The mother said she had had a dwarf child before, a boy, II. 1, who did not live and was only a few inches long. (Bibl. No. 64, p. 270.)

Fig. 699. *The Gibson Family.* Richard Gibson, II. 2, the dwarf artist, is an historical character. Accounts of him are given in biographical dictionaries, and in Walpole's *Anecdotes of Painting*. Born in 1615, he is said to have been a native of Cumberland, but no statement is made with regard to his parents or brothers and sisters. Walpole however states that the artist Wm. Gibson was his nephew, so in that case he must have had a brother. He became page to a lady who discovered his talent for painting and had him instructed by Francis Clein, manager of the tapestry works at Mortlake. He perfected himself by copying Lely's paintings. He became page to Charles I and obtained considerable success as an artist. He drew Cromwell's portrait several times, and under Charles II was appointed instructor in drawing and painting to the Princesses Mary and Anne. His height was 3' 10". He married Anne Shepherd, II. 3, a dwarf of the same height who was in the service of Mary Duchess of Richmond. No note is given of her parents, I. 3 and I. 4, or any other relatives. From their portraits these dwarfs appear to have been true dwarfs. They had nine children, III. 1—9, five of whom lived to maturity and were of normal size. A daughter, III. 9, was a water-colour artist, and Walpole says Edward Gibson the artist was probably a son. Gibson died in 1690 in his 75th year and his wife in 1709, aged 89. They were buried in Saint Paul's, Covent Garden. (See *Iconography*, Nos. 66—7, 185—6, Bibl. No. 42, p. 116, and *Dict. Nat. Biog.* Vol. xxi. p. 283, London, 1890, where there are doubtful statements as to pictures.)

Fig. 700. *Trevisani's Case.* (Antonio Toselli.) I. 1 and I. 2, were both robust; they had three daughters and two sons, II. 1—5, all of normal stature and build. I. 2, was in her 40th year and in the first month of her pregnancy with II. 6 had a fall. She suffered no serious injury, but menorrhagia followed and after this endometritis. She had such pain in the lumbar region that it was impossible to leave her bed until her confinement, which, though difficult, was followed by normal delivery. II. 6, was born January 16, 1808, at Penzance, and was very small at birth. At the end of 9 months his body as a whole was well proportioned, with the exception that his head was a little too large. He was weaned at 14 months. Before this he had whooping cough. He began to walk in his first year and articulated the first words well, but this development did not continue at the same rate, and after his 4th year he grew very little. At 10 years of age attempts were made to instruct him, but he could not be taught the rudiments of learning. At puberty his intellect appeared to improve. At 20 years of age he seemed to be approaching old age. He frequented churches and had no other occupation. He had fair eyebrows, large blue eyes, a large flat nose depressed at the bridge, normal teeth and a large mouth. He had a downy chin and a white flaccid wrinkled skin covered with freckles like other members of his family. His voice was nasal. *Measurements.* Total height 103 cm. Height from soles of feet to top of shoulders 84 cm. Circumference of head around temples 51.5 cm. Arc from the root of the nose to the occipital protuberance 51.5 cm. Distance from the chin to the bridge of the nose 10 cm. Bitemporal diameter 9.9 cm. Height of the forehead 5 cm. Length of the neck 5 cm. Circumference of the neck 36.5 cm. Width of the shoulders 24 cm.; chest at the level of the floating ribs 25 cm.; chest in the upper part 19 cm. Measurement between the two iliac crests 30 cm. Height from the sacrum to the first cervical vertebra 37 cm.; pubis to the upper extremity of the same 37 cm. Length of the upper arm 16.5 cm.; of forearm 13.5; of hand with fingers 11 cm.; of thigh 28 cm.; of leg 19 cm.; of feet 16 cm. Height of the foot from the malleolus to ground 9 cm. Width of extended arms from the middle of the left hand to the middle of the right hand 101 cm. In Merlin's balance he weighed "libbre centesi 60 ed once 6." (Bibl. No. 86, p. 60.)

Fig. 701. *Browning's Case.* II. 2, was the second son of Louis Hopkin, I. 1, who lived near Bristol. I. 1 and I. 2, were normal and had six children, II. 1—6, of whom four were normal. II. 1, is thus described by Browning:—"This surprising but melancholy subject was a young man entering the 15th year of his age though his stature was no more than 2' 7" and his weight 13 pounds, labouring under all the miseries and infirmities of very old age: weak and emaciated, his eyes dim, his hearing very bad, his countenance fallen, his voice very low and hollow; a dry husky inward cough; his head hanging down before so that his chin touched his breast, consequently his shoulders were raised and his back rounded,

[¹ Gould and Pyle give another case: "In the middle of the 17th century a woman brought forth four dwarfs." Nothing more is said about it and there is no reference given! It is possibly Clauder's Case, but such unverifiable statements deserve the severest censure.

not unlike a hump-back. His teeth were all decayed and rotten except one front tooth below. He was so weak, he could not stand without a support. The father and mother both said that he was naturally sprightly, though weakly until 7 years old, would attempt to sing and play about, and then weighed 19 lbs. and was as tall if not taller, naturally straight, well grown and in due proportion, but from that period he gradually declined and grew weaker, losing his teeth by degrees. They said also that this lad had a sister (II. 3), about 10 years of age, in the same declining state." ? not ateleiotic. (Bibl. No. 22, p. 278.)

Fig. 702. *Virey's Case II.* This case is that of the Souvray sisters whom Virey appears to have been the first to describe, at least no earlier description has been found. The Souvray sisters, II. 1—2, were born in the Vosges district of parents of ordinary size. No note is given of any other relatives. II. 2, Anne Thérèse Souvray was aged 73 when seen by Virey in Paris; her height was 33 "pouces." Garnier gives it as 86.4 cm. She was neither scrofulous nor rachitic, but was healthy and active and danced with her sister Barbe, II. 1, who was two years older and 8 "pouces" taller. Garnier gives her height as 105.3 cm. Virey gives an engraving of Thérèse Souvray (see our Plate II (70)), Garnier has an engraving of her and her sister, neither of whom shows any sign of achondroplasia. II. 2, had formerly been the fiancée of Bébé, who was a few years older, but his death prevented the marriage. She, however, called herself Mme Bébé. See Iconography, Nos. 140—141. (Bibl. No. 64, p. 153.)

Fig. 703. *Béclard's Case.* Béclard describes a dwarf, Anna Barbara Schreyer, II. 5. It appears more than probable that this dwarf is the one described by Dornier (Bibl. No. 60) and by Chaussier and Adelon (Bibl. No. 63) under the name of Babet Schreier. The number in the family is the same as that given by Chaussier and Adelon, but the particulars differ somewhat. Béclard's account is followed here as he apparently saw the dwarf, and it seems doubtful if Chaussier and Adelon were not quoting from a previous account. I. 1, was of average height, no statement is made with regard to I. 2. They had five children, of whom four II. 1—4, three girls and a boy, were of ordinary height. Chaussier and Adelon state the first child was rather small and only lived 5 months. II. 5, was born at term, she was 8 "pouces" long at birth and weighed $1\frac{1}{2}$ "livres." She was born October 31st, 1813 (? 1810) and was aged 7, October 31st, 1817. Her teeth showed she was aged 7. Chaussier and Adelon state her growth was rapid until the age of 2 years and then gradually ceased. The bones were well-formed, the muscles firm and the senses normal except for the eyes, which were myopic; the left eye was turned in. Her measurements were:—Weight $8\frac{1}{2}$ "livres." Height $21\frac{1}{2}$ "pouces." Distance from soles of feet to the pubic eminence 9 "pouces." From the soles of feet to umbilicus $11\frac{1}{2}$ "pouces." From the vertex to the umbilicus 10 "pouces." From the vertex to the pubic eminence 9 "pouces" (? 12.5). (Bibl. No. 62, p. 486.)

Fig. 704. *Drysdale and Herringham's Case.* II. 2 and 3, and their antecedents and collaterals showed no dwarfing of growth¹. III. 1, 2 and 3, were normal in all respects and were above the average height. III. 4 and 5, were born dead. No peculiarity known. III. 6, 7 and 8, aged 13, 11 and 7 years respectively, were brought to St Bartholomew's Hospital for "bending of the legs"; in the eldest osteotomy was performed on both sides. Both legs had been quite straight in all three at birth, but began to bend at about the age of 5 or 6 years. Respective heights: 44", $38\frac{1}{4}$ " and $34\frac{1}{4}$ ". Average heights for age are 57", $53\frac{1}{2}$ " and 44" respectively. In each the head is large. The cranial vault is well developed, the forehead prominent and parietal eminences marked. The nose is flattened, but the bridge is not deeply depressed in the manner seen in cases of achondroplasia. The upper limbs are of normal proportional length. Arm and forearm, thigh and leg show a normal relation to each other. (Compare with achondroplasia, in which rhizomelic shortening occurs: see our p. 374.) The lower limbs are not shortened as in achondroplasia, but they are curved so as to lessen the distance of the trunk from the ground, so that the umbilicus is below the mid-point of a vertical line from vertex to the soles of feet. (In achondroplasia this mid-point is displaced as high, or nearly as high, as the ensiform cartilage, owing to the shortness of the lower limbs.) The hands are short, broad and fleshy, but the fingers are not conical in shape; the hand is not "en trident." The hands are like those of myxoedematous rather than of achondroplastic dwarfs. The pulp of the fingers projects beyond the nails. The nails are attached at an angle to the dorsal surface of the distal phalanx. The feet show similar changes. There is enlargement at the epiphyseal junctions of wrists and ankles and at the junction of the ribs and costal cartilages. Radiograms of the hands show marked delay in the appearance of the centres of ossification. Those present in the child aged 7 years, correspond to those present in a normal child at the age of 2 years or 3 years, or are even less advanced. In the child of 13 they correspond to those of a normal child of between 7 and 10 years. (The epiphyses of metacarpal bones normally begin to ossify between the 3rd and 5th years. In the case of the child of 7 no epiphyseal ossification can be seen except the centres for the heads of the metacarpal bones of the fingers.) In all three children the intelligence was normal. They were all three treated with thyroid extract, thymus extract, mercury and potassium iodide and by anti-rachitic measures for long periods without any appreciable result. III. 8, the youngest, was seen subsequently, at the age of 19 years. Her height was then 3' 6", and circumference of head $22\frac{1}{8}$ ". Her face was childlike, the hair was fine, but not thin, the skin natural, so that cretinism was excluded. She was very sensitive

¹ Owing to a slip of the draughtsman I. 1 and 2, which should be normals, are given by wrong symbols on Plate LIV.

as to her condition and complete examination was impossible. III. 7, was then dead. Died aged 20 years of cerebral haemorrhage. A post-mortem examination was made and an inquest held, but no further facts were obtainable. III. 6, was still alive and still a dwarf, but was not seen. The sexual functions were normal in all three. "The condition seems to be due to delayed appearance of the ossificatory process. All the bones were affected except those of the vault of the skull." These authors also give an account of another case, of the same kind, in a woman aged 42 years, but she had no known relatives similarly affected. (See Bibl. No. 575, p. 193.)

Fig. 705. *Schaaffhausen's Case*. Schaaffhausen gives two accounts of this case. The first just after the death of II. 4, in 1868, the second after the exhumation of his skeleton in 1882. The family who were called Lehnem were induced to permit the exhumation by a medical student Peter Lehnem. Similarity of name suggests relationship, but nothing is said on that head. I. 1 and I. 2 were tall. They had nine children, eight boys and one girl, II. 1—9. II. 1, was tall, II. 2—3, were about 5 "Fuss" high. Of the others four, II. 4—7, were dwarfs, and the two others, II. 8—9, "sind zwar schon mit 6 Jahren gestorben, aber man sah dass auch sie klein bleiben worden." II. 5, was same height as II. 4, II. 6, was 5 "Zoll" higher. II. 7, also a dwarf, who was dead, had like the others a high voice and no beard. II. 4, who died aged 61, was seen by Schaaffhausen and there was an autopsy. His height was 94 cm., and the size of his head was not remarkable. The circumference of his head was 520 mm., length of head between forehead and occiput 170 mm. Maximum breadth of head 150 mm. Weight of brain 1183.33 gms. Weight of body 45 "Zoll Pfund." His mental faculties were good. His milk teeth had fallen out at the age of 22. As an old man he had lost most of his front teeth, but had no gray hair or sign of baldness. He had a high voice, no hair on his face or elsewhere except on head; his nose was undeveloped, the under lip broad and chin weak. The skull was of a child-like type which showed itself especially in the projecting protuberances of the skull. All the sutures were open. The brain showed numerous convolutions and deep sulci. The internal organs were like those of a child aged 6 years. He had bi-lateral cryptorchism. After exhumation the following measurements were given:—Length of femur 22 cm., of tibia 16.20 cm. Length of skull 164 mm., breadth 147 mm., height 121 mm. Schaaffhausen accounts for the difference in length of skull at autopsy and after exhumation by assuming it became shortened in the grave (allowance for flesh). Almost all the epiphyses of the long bones were ununited, many of them separated easily from the diaphyses. The only parts of the skeleton which were of normal size were the teeth and ossicles of the ear. This dwarf died at Coblenz and is generally known as the Coblenz dwarf. It may be noted that the dwarf artist Jacob Lehnem was born near Trier and the two places are not so far apart as to render a family connection improbable. (Bibl. No. 136, S. 26.)

Fig. 706. *Tissie's Case*. I. 1, a carter living in the vicinity of Bordeaux. I. 2, his wife, occupation housewife. They are cousins "germans." Both are of average height and both are in good health. No alcoholism or syphilis. "No heredity of dwarfism." II. 1, aged 25 years, is of height 1.64 m. II. 2, aged 23 years, is of height 1.75 m. Both have performed their military service. II. 3, aged 21 years. Height 0.98 m. II. 4, aged 20 years. Height 1.11 m. II. 5, child died young. Age and sex not stated. II. 6 and 7, aged respectively 12 years and 5 years, are developing normally. In the case of II. 3, aged 21 years, the pregnancy began three months after the birth of the second child. A normal pregnancy followed. No nervous or moral shock or trauma occurred during it. An easy labour occurred; breech presentation. Child very small at birth. Its growth was very slow. Weaned five or six months after birth, then bottle fed. "Favus and eczema" at the age of 5 or 6 months. Did not begin to walk until 1 year and 10 months of age. Body well proportioned. Torso developed. Thighs and arms normally proportioned to the height. Hands spatulate, the second and third phalanges being arrested in development. Persistence of cartilage of ossification in various bones. An exostosis on the lower end of left humerus. The toes present peculiarities similar to those of the fingers. The great toes are relatively enormous. Menstruation regular since 16 years of age. Marriage in view. She is intelligent. She occasionally falls out of bed at night under the influence of dreams but has no active somnambulism. II. 4, shows the same kind of arrest and development as his sister. At birth, head presentation and easy labour after a normal pregnancy. He is normally proportioned and is intelligent. He has been to school but has not learned to read or to write. He shows complete development of the sexual instinct. Neither of these dwarfs has any enlargement of the thyroid gland. (See Bibl. No. 321, p. 408.)

Fig. 707. *Schreier's Case*. I. 1 and 2, peasants living in Stromholz in Holstein, were both healthy and both of strong constitution. They had 13 children by their marriage. Of these, ten were from 6 $\frac{1}{4}$ ' to 6 $\frac{1}{2}$ ' (German) in height, but three were of dwarf stature, II. 2, 3 and 5. II. 3, Johanna Green, at the age of 9 years, measured 16" in height; at the age of 18 years she was 23" (German) in height and weighed 20 pounds (German); at the age of 34 years her height was 2' 6 $\frac{1}{2}$ " (German). She was normally proportioned in every way. At her confinement it was proved that the pelvis was of normal size relatively to the rest of the body. It was broad and normally formed, with a conjugate of 3"; the sacral promontory could scarcely be felt. "It was obviously not a rickety pelvis." On the death of her parents in her 9th year she left her birthplace and went to Eckernförde. Here she had to contribute to

her maintenance in part, by her work, as her foster-parents were poor. Having lived with these people, from whom she did not receive the kindest of treatment, for $2\frac{1}{2}$ years, she went to a widow, an innkeeper. She remained with this woman $3\frac{1}{2}$ years, during which time she learned the essential handicrafts such as sewing, dressmaking, etc. When she returned to her brethren, these had determined that she should join a troupe of travelling players; but in this project they were forestalled, for just then Herr Hawlitschek came to that place with three dwarfs on show. Johanna and her sister, Catharine, II. 2, now 40 years of age, determined to join this show. Herr Hawlitschek observed that she had a talent for entertaining by singing and declamation. By the time she was 18 years of age she was an accomplished singer, harpist and reciter of small pieces. She visited, in this way, the chief cities of Germany, Switzerland and France, was presented to many notable persons and received many presents. She then returned to Holstein and subsequently went to Hamburg, where, during an illness, she came under the care of Dr Schreier, who attended her during a confinement. The child, III. 1, a male, was delivered dead (having died several days before birth) after perforation of the head. The child was normally developed except for an "external hydrocephalus," and was of almost normal size; it was certainly viable except for the "external hydrocephalus." II. 4, the father of this child, was of normal size. Four weeks after the confinement she went away, taking the child, preserved in spirit, to Sweden, Russia and Austria, where she gave demonstrations and showed the child. She amassed sufficient money to set up as an innkeeper near Altona, where she had been for two years. By this means she supported her whole family. (See Bibl. No. 110, p. 116.)

Fig. 708. *Levy's Case.* In 1858, III. 1, an unmarried female dwarf, aged 39, came to the Hospital as she was enceinte. Her father, II. 1, was a dwarf, her mother, II. 2, of average height, her paternal grandfather, I. 1, was also a dwarf, most likely a court dwarf, as there was a picture of him in the portrait gallery at Frederiksborg. Accurately measured her height was 44" and she was well proportioned. From her 14th year she had acted as her father's clerk, then she had the advantage of being taken into a noble family for some years and later set up house for herself in town. She was lively, gay and fond of dress. She finally started a pension for men, with the result that she became enceinte. She looked like a girl of 8 or 9 years of age. At first the doctors thought Caesarian section would be necessary, but closer examination led them to adopt other methods. The child, IV. 1, was born and was a well-made thin slender-limbed girl. All attempts to resuscitate it failed. It weighed $4\frac{1}{2}$ lbs. and measured $17\frac{1}{2}$ ". The mother died the second day after birth. Measurements of mother:—Length of head $6\frac{1}{8}$ ", minimum breadth of head $4\frac{1}{2}$ ", maximum breadth 5". Cephalic index = 81.08, i.e. the skull was brachycephalic. Length from vertex to sole of foot 44"; vertex to umbilicus 18"; umbilicus to sole 26"; acromion to capitulum ulnae $14\frac{1}{2}$ "; of hand from the styloid process of the radius to the end of the index finger $4\frac{1}{2}$ "; lower limbs from the great trochanter to the external malleolus $20\frac{1}{2}$ ". (Bibl. No. 121, p. 304.)

Fig. 709. *Virchow and Maass's Case.* (The Burmese Dwarfs.) These dwarfs were in Castan's Panopticum in 1896, and remained in Berlin three years. They were exhibited by Maass before the Society for Anthropology and Ethnology in Berlin, but Virchow appears to have also had details of them. In 1910, II. 6, was exhibited at Olympia, London, and was seen by Dr Rischbieth, who got further details.—Virchow stated that the Burmese company with which they were came from Mergui, Upper Burma, and according to the district official of Mergui, the father, I., Mong Sein Bu was dead, no statement was made about I. 2. The three children, II. 4—6, were with the company. II. 4, and II. 6, were dwarfs, and II. 5, was normal. II. 4, and II. 6, were charming little things with well-proportioned bodies, bronze-coloured, with well developed teeth, long smooth hair and black eyes. II. 6, had a slight convergent squint. The adults with them, two males and a female, who were probably relatives were well grown and of medium height. The measurements given do not agree. The district official of Mergui on July 27, 1896, described them thus: Phatama, II. 4, age 14, height 31". Kyn Lui, II. 5, age 11, height 41". Samar Arm, II. 6, age 10, height 28". Maass' measurements in the same month and year are: Fatma, II. 4, age 16, height 65 cm., Smaâm (alias Smaûl), II. 6, age 14, height 60 cm. Virchow's measurements were II. 4, height 74.6 cm. II. 6, height 68.2 cm. II. 5, Kyn Lui or Julei, age 11, height 125.9 cm. Head measurements are also given. Length of head, II. 6, 127 mm. II. 5, 171 mm. II. 4, 126 mm. Breadth of head, II. 6, 111 mm. II. 5, 141 mm. II. 4, 102 mm. Cephalic index, II. 6, 87.4. II. 5, 82.4. II. 6, 80.9. Further measurements are given but it is stated they were not altogether trustworthy owing to the uneasiness of the children and the indefinite limit of their hair. Rischbieth states that I. 1, and I. 2, had four normal sons, three other normal sons, II. 1—3, have therefore been entered in the pedigree in addition to Kyn Lui, II. 5. He also was told that II. 4, was a dwarf and "died young." He thus describes II. 6, "Smaân Sing H'poo, aged 26, is a 'Burmese Ring Performer' or 'Music Hall Artist.' No physical examination, measurements or radiographs were permitted, so that this account is of little value. His height is approximately 2' 9" to 3', being inferred from comparison with tables and other surrounding objects. He has marked internal strabismus of the L. eye, and no hair about the face. The facial expression is that of an adolescent of his race. The bridge of the nose is not depressed, the frontal and parietal eminences are not prominent and indeed the cranium appears relatively small and round, so much so as to suggest

microcephaly. The chin is somewhat receding, but he has no symptoms of idiocy. The length of the limbs relatively to trunk and head and the proportions of one segment to another are those of an ordinary adult. The limbs are rather slight but otherwise well formed, they show no curvatures and are not shortened. The hands show no peculiarities. The skin is normal, the hair thick and not dry or brittle. The voice is squeaky and childlike. He is intelligent, vivacious, quick of movement and in no way defective mentally. His self reliance is shown by the fact that he roller-skates on a crowded rink at Olympia amongst individuals of ordinary size and of many times his own weight (many of whom are not expert, judging by the number of downfalls that occur) without being crushed and killed. A photograph of this individual is shown on Plate DD (54). His condition presents no resemblance to cretinism or infantile myxoedema and appears to be an example of true dwarf growth or ateleiosis of the type shown by Caroline Crachami in which the cranium takes part in the general hypoplasia, in contrast to the usual condition in which its capacity is proportionately greater than usual. He does not appear to be an example of microcephalic dwarfism, as he is in no way mentally defective, but possesses considerable intelligence, though possibly somewhat childish for his age. This is however difficult to judge owing to his environment [those of a 'show' dwarf in a large collection]. He hugs and kisses a small female dwarf in this collection, to whom he appears to be much attached." (Bibl. No. 323, p. 524.)

PLATE LV. Fig. 710. *Wood's Case I.* III. 6, Calvin Philips was born at Bridgewater, Massachusetts, Jan. 14, 1791. When born he weighed scarcely two pounds and his thigh was no thicker than a man's thumb. He had none of the ordinary ailments of childhood except whooping cough. He was weaned at seven months, walked at 18 months, but did not speak till he was four years old and ceased to grow at five years. His teeth came at 10 or 11 months, and he had the usual number. At the age of 8, his height was 26½" and his weight 12 pounds including clothes. He was active, playful, sprightly and much devoted to childish sports, but his mental attainments were not up to those of normal boys of his age. His figure was well proportioned and his face though thin and delicate was regular and agreeable and much matured beyond his years. He had five brothers and sisters, III. 1—5, all of ordinary height. His parents, II. 2—3, were normal, II. 2, being aged 24, and II. 3, aged 26 at his birth. His grandparents, I. 1 and I. 2, exhibited him in New York in 1810. I. 1, was a big robust man aged 56. No measurements are given. Garnier (Bibl. No. 205), who also gives an account of this dwarf under the name Philippe Calvin, says he died aged 20, of "old age." Wood says nothing about his death. (Bibl. No. 138, p. 385.)

Fig. 711. *Kirby's Case I.* II. 1, Nanette Stocker was born at Kummer in Upper Austria. Her parents, I. 1 and I. 2, were of ordinary stature as was also a younger brother, II. 2. She was a 10 months and 24 days child and larger when born than children usually are. She did not exhibit anything remarkable, except that she was rather unwieldy till the age of 4, when she ceased to grow. She was then 33" in height. She was well formed, well proportioned and never ill. She had a talent for music and was exhibited by her tutor with John Hauptmann aged 20, and four years older than herself. He was born at Ringendorff near Bousvillers, Dept of Lower Rhine; his height was 36" 2", and he had an extraordinary talent for music. In 1815, II. 1, was aged 33, weighed 33 pounds, and measured 33". She died in Birmingham in 1819. Her portrait and that of John Hauptmann, reproduced from Kirby's *Wonderful Museum*, are given on Plate II (69). (Bibl. No. 53, p. 228.)

Fig. 712. *Wood's Case II.* II. 2, Robert Skinner was born at Ripon, Yorkshire. No note of his parents or other relatives is given. He was 2' 1" in height and married II. 3, who was an inch taller. She was Welsh and her Christian name was Judith. They were married at St Martin's Church and lived together 23 years and had fourteen children, III. 1—14, all well grown and healthy. They were exhibited in London in 1742. II. 2, was then aged 44. They only exhibited themselves for two years. II. 3, died in 1763, and II. 2, in 1765. He is said to have left £22,000. (Bibl. No. 138, p. 350.)

Fig. 713. *Gilford's Case I.* II. 6, aged 28, was born in Layer Breton, Essex, Feb. 23rd, 1874. Photographs of I. 1 and I. 2, and some of their other children showed they were of ordinary size. I. 1 and I. 2, had eight children II. 1—8, six sons and two daughters, one of whom had died of pneumonia. II. 6, had measles in childhood and had influenza twice since 1899. He was of average size when born and cut his teeth at the usual time. It was first noticed he was not growing when between 1 and 2 years of age, though there was nothing to account for it. He went to school at 10 years old and left at 16 after passing the sixth standard. He was first seen when aged 23. His size and general configuration were those of a child; the head was large in proportion to the body and the outlines of the muscles were hidden by fat. The head was broad and of great depth from the sagittal suture to the ears. The face was broad and the bridge of the nose sunken. Sexual hair was absent, but there was plenty of hair on the head. The mental development and tastes were somewhat childish. He was fond of reading and capable of steady application to his work and earned 3s. a week as under-gardener. The organs of special sense appeared normal. The external organs of generation were in size and appearance

like those of a child of 3, the testicles were undescended. All the bones were slightly formed, but there was no irregularity of ossification anywhere:—*Measurements*. Height when just over 23, 107.8 cm.; 1 year later 108.6 cm.; 3 years later 109.6 cm. Circumference of head 49.3 cm.; maximum length of head 17 cm.; breadth 13.9 cm. Round chest in nipple line (inspiration) 62.6 cm.; (expiration) 61 cm. Round abdomen 56 cm. From acromion to elbow 20.75 cm. External condyle to styloid process 17.3 cm. Length of hand 11.75 cm. Great trochanter to external condyle 28.5 cm. Lower end of femur to internal malleolus 24 cm. Length of foot 17 cm. Weight 25 kilograms. The middle point of the total length was 1 cm. above pubis. (Bibl. No. 403, p. 316.)

Fig. 714. *Gilford's Case II*. This is the case of a French dwarf. I. 2, came to Gilford to seek advice for obesity, she was of ordinary stature and said her husband I. 1, and two of her children II. 1—2, were of normal stature and she did not know any member of the family who had ever had any abnormality of growth. II. 3, aged 18 was born in Paris, she was small at first but grew at the ordinary rate to a little over 2 years of age. After this she continued to grow at a uniform but diminished rate. She had attacks of bronchitis in childhood but was otherwise healthy. She showed no signs of approaching puberty and in almost every respect resembled a child, but her intelligence seemed more mature than is usual in a child of her height. She was lively but not restless, her hair was fine, eyes full and the nose was depressed at the bridge. Her teething began in the 8th month, and the teeth formed two irregular rows much crowded and displaced. Ossification was little more advanced than in a child of 6. There was no hair on her body, the breasts and sexual organs were undeveloped, the pelvis that of a child. The mother said she could walk 3 kilometres (2 miles), and had walked 6 kilometres (3½ miles) without undue fatigue. She was an expert dancer and gained her living on the stage: *Measurements*. Total height 85.0 cm. Circumference of head 44.5 cm. Round chest in nipple line between inspiration and expiration 47.5 cm. Round abdomen at umbilicus 46.0 cm. Length of arm 15.3 cm.; forearm 14.0 cm.; hand to extremity of middle finger 10.75 cm.; thigh 23.0 cm.; leg 25.0 cm.; foot 12.5 cm. The photograph of this dwarf is reproduced on Plate AA (42). (Bibl. No. 403, p. 320.)

Fig. 715. *Kirby's Case II*. II. 5, Simon Paap was born at Zandvoort in Holland in 1789. His father I. 1, a fisherman and his mother I. 2, were normal. They had four other normal children II. 1—4, two sons and two daughters. II. 5, exhibited no sign of anything remarkable till he was 3 years of age, when he stopped growing. He was exhibited at Bartholomew Fair, Smithfield, in 1818. His height was then 28" and his weight 27 pounds. He was handsome and well proportioned in his limbs and body, but his head was disproportioned being rather large. He spoke Dutch, French and English with fluency and correctness. Garnier states that he died at Dendermond, Dec. 2nd, 1828. His portrait is reproduced from Kirby on Plate RR (97). (Bibl. No. 53, p. 147.)

Fig. 716. *Wood's Case III*. I. 1, a little German woman, the "Dwarf of the World," in July, 1700 was "at the brandy shop over against the Eagle and Child, in Stocks' Market," where the Mansion House now stands. She was only 2' 8" in height, the mother of two children and was "carried in a little box to any gentleman's house if desir'd." Her handbill runs as follows: "At the Brandy Shop, over against the Eagle and Child in Stocks' Market is to be seen any hour of the day, from eight in the morning till nine at night, a Little German Woman, the Dwarf of the World, being but 2 foot 8 inches in height, and the mother of 2 children, as straight as any woman in England, she sings and dances incomparable well, she has had the honour to be shown before Kings and princes, and most of the nobility of the land; she is carried in a little box to any gentleman's house, if desir'd." Another handbill of the same person and period, states that she was 49 years of age. (Bibl. No. 138, p. 307.)

Fig. 717. *Home's Case*. This is the case of Caroline Crachami. Her mother I. 2, an Italian or Sicilian woman aged 20, was travelling in a caravan with the baggage of the Duke of Wellington's Army in the Peninsular War and was frightened by a monkey which got under her clothes while she slept, she being then three months gone with child. She did not miscarry, but the child II. 2, when born weighed 1 pound and was 7" long. II. 2, was brought to London and shown as a curiosity and died after completing her ninth year. The *Times* of June 17th, 1824, gives an account of how the body was stolen and of the distress of the father I. 1. The skeleton is now in the Royal College of Surgeons, London. When seen by Home she could walk alone but with no confidence, her sight was very quick, her voice shrill and she had some taste for music. I. 2, had a fifth child II. 3, in Ireland, who like her three first, II. 1, was naturally formed. The following measurements and description of the skeleton are given by Hastings Gilford (Bibl. No. 403.) Height 49 cm. Middle point of total height 1.3 cm. above symphysis pubis. Length of spine 5.8 cm. (15.8), of clavicle 4.8 cm. Acromion to elbow 8.9 cm. External condyle to lower end of radius 7 cm. Femur 12 cm. Tibia 9 cm. Total length of lower extremity 23 cm. Foot 6.18 cm. Hand 6 cm. Maximum length of skull, 12.6 cm. Maximum breadth 9.4 cm. Vertex to base 8.55 cm. Circumference 33 cm. The skull is very thin and delicately formed. The anterior fontanelle is open for a length of 1.6 cm. and width of 1.2 cm. The lower half of the frontal suture is closed, but there is a small unossified oval area 6 mm. long near the superior angle of the occipital

bone close to the lambdoid suture on the L. Another is present at the bottom of each occipital groove. The ear bones are of adult size¹, but the tympanic bone is a mere ring, like that met with in infants. Ossification throughout is generally delayed. This is shown in the backward condition of the epiphyses and the smallness and delicacy of the shafts. The long bones possess hardly any curve. The ribs have very abrupt curves at their angles and are almost straight from thence onwards. See our p. 368 and Plate Z (38). (Bibl. No. 58, p. 191.)

Fig. 718. *Gilford's Case III.* I. 1, was a "small-made" man rather below medium height. I. 2, was of average height and so were her children, II. 2, aged 28, excepted. II. 3, aged 13, was 1.34 m. in height, and I. 2, said she believed II. 2, was about the same height at the same age, he seemed to stop growing at that time, but she could not account for the circumstance. He was healthy at the time and had no illness before or since; his proportions and appearance were those of a boy of 14. His occupation was that of a farm boy, but he was too stupid to do better work than minding sheep. He was capable of working all day and then taking a four miles' walk without being tired. His hands and feet were rather large and there was slight kyphosis and lordosis of the spine. He was also knock-kneed and flat-footed to the same degree so that his gait was somewhat awkward and shambling. The hair of his head was fine and thin and he had plenty of lanugo on the body and limbs. His teeth were sound and dentition regular, there was no sign of syphilis. The ossification was that of a boy of 14 or 15. The special senses were of ordinary acuteness. The external genital organs were of the size and appearance of those of a child of 8 or 9. There was no pubic hair, the R. testicle was undescended, the L. could be felt half-way down the inguinal canal. He was unusually timid and modest. Three months later he got ill, pneumonia set in, he had a series of eclamptic attacks and died in one of them. There was a post mortem. *Measurements.* Weight 35.6 kilos; brain 1275 grms. Height 146 cm. Circumference of head 52 cm.; length 174 mm.; breadth 142 mm. Circumference of chest round nipple line 73 to 75 cm. Circumference of abdomen at umbilicus 69 cm. Length from acromion to elbow 24.5 cm.; external condyle to styloid process of radius 22 cm. Length of hand 17.5 cm.; from great trochanter to external condyle 39 cm.; external condyle to external malleolus 36.3 cm.; of foot 25.3 cm. Middle point of total height 2 cm. above pubis. (Bibl. No. 403, p. 335.)

Fig. 719. *Garnier's Case.* II. 1, Lucia Zarate a female dwarf was born at San Carlos near Vera Cruz, Mexico, of Spanish parents I. 1, and I. 2, who had other normal children II. 2. She could speak Spanish and a little English. She weighed 2½ pounds (livres) at birth. Her height is not given but a picture of her and General Mite with whom she was exhibited is shown. From this she appears to be a true dwarf. The cranium is proportionally small and she is probably an example of Hastings Gilford's Group 1 as were Caroline Crachami and Bébé. (Bibl. No. 205, p. 230.)

Fig. 720. *Illustrated London News. Case I.* The *Illustrated London News* of May 24th, 1851, gives a picture of this dwarf II. 1, and her mother, and also a short account of her. Wood (Bibl. No. 138) also gives an account of her and thinks she is identical with a Miss Gibbs, daughter of a farmer named Gibbs, of Blean near Canterbury, who was exhibited. Her parents I. 1, and I. 2, were of normal stature and no note is made of any other children. When exhibited at the age of 14 months, her height was 16" and her weight 5 pounds. Her feet were 2" long and she possessed the utmost regularity of limb and feature. She was exhibited at University College, London, to more than 500 doctors. (Bibl. No. 101, p. 450.)

Fig. 721. *Illustrated London News. Case II.* The three dwarfs in this case were exhibited in the Cosmorama, Regent Street, and a picture of them appeared in the *Illustrated London News* of May 30th, 1846. They were natives of the county of Ross and were born in the province of Lochcarron; their father, I. 1, was a shepherd of the district, but nothing is said about either his stature or that of his wife I. 2, nor does it state whether there were other children besides the three dwarfs. II. 1, the eldest (the central figure in the engraving), was 23 years old, 45" in height and weighed 5 stone 11 lbs. II. 2, aged 21, was 44" in height and weighed 5 stone 3 lbs. II. 3, aged 19, was 44" in height and weighed 5 stone 10 lbs. In the picture their limbs look quite in proportion to their height, but the heads look a little large. (Bibl. No. 90, p. 357.)

Fig. 722. *Magitol's Case.* This case is also described by Larrey. I. 2 and I. 3, were both well formed. They had three children, II. 1—3. II. 1, aged 17, was quite normal. II. 2, who died a few days after birth, was also normal. II. 3, the third child, born when his parents were both 27 years old, was a dwarf. As far as the parents knew no such anomaly had occurred before in their families. The mother said she got a great fright in the fifth month of her pregnancy with this child. He was so small when born that he was wrapped in a pocket handkerchief, but he was neither measured nor weighed. Nothing particular happened during his infancy except a fall which caused incomplete dislocation of the right knee outwards; this dislocation had never been reduced, which accounted for the limp which he had. When seen, at the age of 14, he was in general well proportioned, one might almost say there was complete equilibrium between the different parts of his body; but the height of his head relative to the height of

¹ This of course is the normal case, the bones being full-sized at birth.

his body was not quite normal according to the canons of sculpture, and another disproportion existed in the extraordinary size of his nose and its projection from the middle of the face and of the intermaxillary, without however any trace of hare lip. His nose measured 4.5 cm. in total length and was 2 cm. broad at the base. I. 1, a paternal uncle, had the same kind of nose. His skin was rather dark, his hair dark chestnut, smooth and abundant. The limbs, hands and feet were regularly proportioned, but the feet were flat and the hand only showed a weak development of the thenar eminence. He weighed 9 kilogs. His intelligence was moderate, about that of a child of 10. He could read and write, had a good memory and sang various romances of his country. He had no hair in the axillae or on the pubis. *Measurements.* Height 93 cm.; of external auditory meatus from ground 87 cm.; the acromion 75 cm.; epicondyle 56 cm.; styloid process of the radius 44 cm.; medius 33 cm.; umbilicus 57 cm.; symphysis pubis 45 cm.; antero-superior iliac spine 51 cm.; knee 27 cm.; external malleolus (flat foot) 2 cm. Width of shoulders posteriorly (back slightly curved) 20 cm.; anteriorly 15 cm. Head measurements: Maximum ant. post. diameter of the skull 14 cm. "Diamètre iniaque" 14.5 cm. (?). Maximum transverse diameter 12 cm. Bi-auricular diameter 10 cm. Bi-temporal diameter 10 cm. Horizontal circumference of skull 39 cm. "Courbe iniaque" 35 cm. (?). Height of face 14 cm. Bi-zygomatic diameter 9 cm. Bi-malar diameter 7 cm. Maximum vertical diameter of the head 14 cm. The length of the little finger relative to the ring finger was such that its extremity did not quite reach the level of the last inter-phalangeal joint like that of the normal individual. The lower limbs exhibited nothing particular except complete absence of calf. His legs were thin, but he was agile and adroit in spite of his limp. The genital organs were normal. His dentition was not so advanced as is normal at his age; his teeth were free from caries, and his milk teeth, of which he had lost four or five, were according to his parents equally healthy, but those which remained were deformed and atrophied. (Bibl. No. 186, p. 692.)

Fig. 723. *Zagoraki's Case.* I. 1, aged 25, came to Basel Hospital for her confinement. Her physical and mental development was very backward and she would answer few or no questions. Her people stated she had always been healthy and had done her share of housework well. Caesarian section was performed and the child, a female, was delivered alive; it was normally proportioned, showed no abnormality and weighed 5 Pfund (civil weight). The pelvic measurements of mother were:—True conjugate 4" $2\frac{3}{4}$ " (Swiss), 4" 8" (Paris). Anterior transverse diameter 2" 8" (Swiss, 3" 1" Paris). Posterior transverse diameter 3" 4" (Swiss, 3" $9\frac{1}{2}$ " Paris). Diagonal conjugate 4" 8" (Swiss, 5" 4" Paris). Antero-posterior diameter of true pelvic cavity 4" (Swiss, 4" 6" Paris). Depth of pelvis (vertically) 2" 8" (Swiss, 3" 1" Paris). I. 1, died. On autopsy: The body was very small; length 139 cm.; length of humerus 20 cm.; of forearm 20 cm. Two series of measurements of the pelvis are given, one taken during life, one after death; it was of that unusual variety, pelvis nana or dwarf's pelvis. In size and shape it was that of a child of 6 or 7 years of age. (Bibl. No. 137, p. 57.)

Fig. 724. *Ludwig's Case.* This case is quoted by Lawrence from Ludwig. Ludwig himself says that II. 1, Catharina Helena Stoberin, of Nürnberg, was about 3" (3 Fuss) high in her 20th year, well proportioned and intelligent. Her pulse was weak like that of a child. Her parents, I. 1, and I. 2, and her brothers and sisters, II. 2, were dwarfs. Ludwig refers to Lavater and Wunsch, neither of whom, however, mentions any relatives. Garnier states he could find out no particulars with regard to C. H. Stoberin. There are particulars of her in various books (see Iconography, No. 138). She was certainly a true dwarf, but for the details of her family we can depend only on Ludwig's statement. (Bibl. No. 49, p. 154.)

Fig. 725. *Michaelis' Case.* I. 1, was a small Jewess about 4' high and quite normally proportioned. Measurements of pelvis were:—External conjugate 6"; interspinous 6" 9"; intercrystal 8" 3"; intertrochanteric 9" 9"; diagonal conjugate 3" 11". She bore the two children, II. 1—2, without difficulty in labour. They only weighed 5 lbs. (Bibl. No. 102, p. 163.)

Fig. 726. *Naegele's Case.* I. 1, was a strong man rather above average height. I. 2, who had been dead 23 years, was said to have been of small stature. II. 3, aged 29, was of medium height, healthy and of good appearance. II. 2, aged 31, was only 3' 6" in height but otherwise well proportioned, her head and limbs were in normal proportion to the size of her body and except for her features she looked like a child of 7. The joints of her extremities showed no trace of enlargement. Her mental powers and inclinations resembled those of a child. She had been healthy from infancy, was good-humoured, and on this account much beloved by her father; she was diligent and active in any household work suited to her powers. She menstruated at 18. Her first intercourse with a strong man was very painful and accompanied by great loss of blood; she had been with him altogether 10 times. Throughout her pregnancy she was quite well. She quite understood her position, had thought about it and spoken to others and absolutely refused to allow Caesarian section; and her father only permitted her to be under Naegele's care when she was six months pregnant on condition no such operation should be attempted. Delivery was by forceps; the child, a boy (sex omitted on Plate), weighed 3 Pfund 6 Loth (civil weight), and was born dead. The mother died on the 10th day after birth of "indigestion caused by eating dainties" of which she was very fond. The pelvis appeared to be a perfectly well-formed female pelvis on a small scale. Measurements of

pelvis:—From the sacral promontory to the subpubic angle 3" 3". From tuber ischii to crista ossis ilii 5" 5". From tuber ischii to linea innominata ossis ilii 2" 7". Height of the symphysis pubis 11". Antero-posterior diameter of pelvic inlet 3". Transverse diameter of pelvic inlet 3" 7". Transverse diameter of pelvic outlet 3". Antero-posterior diameter of the pelvic cavity 3" 3½". Transverse diameter of the pelvic cavity 3". The vertebral column, the pelvic bones and in short the whole skeleton did not exhibit the soft thin conformation which one observes in rickets: the innominate bones in their iliac portions did not appear short in mass or circumference as in rickets; neither these bones nor those of any other parts showed any trace of any rickety tendency having existed; on the contrary in volume and size they corresponded in every respect to the size of the body. It would be hardly possible to see a better proportioned frame than the skeleton of this individual. (Bibl. No. 81, p. 181.)

Fig. 727. *Paltauf's Case*. II. 4, came to Hospital at age of 49. He had worked for some years as private servant to a Colonel and later as a gardener and had got rheumatic affections in his knees. Some years after he had general oedema and three weeks before entering the Hospital he developed dropsy. He died 12 days after entrance. His parents, I. 2 and I. 3, and his sister, II. 3, were of normal stature and he had two half-brothers (whether paternal or maternal not stated), II. 1—2, who were big strong men, one of them, II. 1, died after suffering for a year from cough and chest affection. II. 4, was 112.5 cm. in height with thin and light bones and moderately developed muscles. *Measurements*. Head: Circumference of head 54 cm.; length of face 18 cm.; mento-occipital diameter 22½ cm.; bi-temporal diameter 14 cm.; bi-parietal diameter 15 cm. Thorax: Breadth at highest point of axillae 15.5 cm.; antero-posterior diameter at height of second rib 15.5 cm., at height of nipple 16.5 cm.; length from clavicle to arch of ribs at nipple line 19.5; circumference at the level of the nipples 67 cm. Pelvis: Distance between the antero-superior iliac spines 18.5 cm.; between the iliac crests 19.5 cm. Extremities: From acromion to distal extremity of middle finger 52 cm.; styloid process of ulna to olecranon 18.5 cm.; styloid process of radius to deepest point of the fossa cubitalis 16 cm.; great trochanter to external malleolus 56 cm.; internal condyle of femur to internal malleolus 28 cm.; great trochanter to external condyle of femur 26 cm. Abdomen: Circumference at a level two fingers' breadths below the extremity of the xiphoid process of the sternum 73 cm.; midway between the extremity of the xiphoid process and the symphysis pubis 79 cm. When dissected the body measured 111 cm. The head appeared relatively large; the face broad and short. The neck was short, the abdomen prominent and rotund, the hands and feet very small. (Bibl. No. 262, p. 6.)

Fig. 728. *Virchow and Nagel's Case*. II. 9, Pauline Musters has been described many times. Virchow described her in 1882, Bouchard in 1884, Mortillet in 1885, Manouvrier also wrote of her though apparently he had not personally seen and measured her; the last description is that of Nagel who was present at her death. II. 9, was born at Ossendrecht, Holland, Feb. 26th, 1878 (Nagel gives date 1876). Dr van der Moolen, in a letter to Bouchard, says that the doctor who attended her mother, I. 2, at her confinement had given him particulars and that the uterus with its contents had remained nine months in the pelvic cavity, to this fact he attributed the small size of the child. I. 1 and I. 2, were Dutch. Van der Moolen, who knew the family, states I. 2 was well made but thick-set and I. 1, a cobbler, was a drunkard. This couple had 12 children, II. 1—12, of whom II. 9 was the seventh. II. 10, a seven months child, was still-born and was said to have been even smaller than II. 9, but Bouchard expresses some doubt on this point. When Nagel wrote there were six sisters, II. 1—6, and two brothers, II. 7—8, all rather above average height and all alive. Mortillet mentions seven sisters. All accounts agree in stating II. 9 was well-made; three weeks after birth her length was 30 cm. and her head, trunk and limbs were all in proportion. She was of average intelligence. Bouchard, Virchow and Nagel all give tables of measurements, Virchow's and Nagel's measurements are given below. Nagel says she was nearly perfect in bodily development, of rather pleasant features, graceful in all her movements and of good general education, speaking Dutch, French, German and a little English. Nagel attended her in her last illness, which originated in a simple cold taken during her performances at the theatre where she performed all sorts of acrobatic feats. Before her illness she was said to have been in perfectly good health and free from physical defects of every kind. She had menstruated at 16. Her body had all the characteristics of a fully developed woman. Her breasts were round and prominent and the pubes was covered with hair. Her vitality was lowered by her constant performances and her relatives tried to replenish it by means of stimulants administered after every performance. She consumed in this way large quantities of alcoholic beverages. Her cold developed into bronchitis, bronchitis into pneumonia complicated with meningitis and she died in 10 days. Nagel states her body had become considerably elongated during her illness. *Virchow's Measurements*. Total height 53.8 cm. Measurement of extended arms 53.6 cm. Length of head 134 mm. Breadth of head 107 mm. Height of head from ear 8.2 cm. Circumference of head 36.3 cm.; forearm 6.0 cm.; calf 10.5 cm. Length of hand 6.3 cm.; foot 7.8 cm. Weight about 8 lbs. *Nagel's Measurements*. Height at birth 12"; 19 years old when alive in stockinged feet 19". Length of body when dead 24"; arm to tip of fingers when dead 12"; leg from hip to tip of toe when dead 12". Circumference of head 16". Length from chin to forehead 5½"; chin to ear 3½". Circumference of chest across breasts 18½"; higher up under axillae 19"; of abdomen 19"; around hips 18"; across waist 17". Length of foot 4"; hand 3½". Distance from shoulder to shoulder in front 7½". Circumference of

thigh 7"; of knee 6"; of calf 4½". Weight in normal health from 7½ to 9 lbs. Mortillet (Bibl. 215) gives her height as 59 cm. and weight 9 lbs. According to Manouvrier the measurements given by Testut and Bouchard in 1883, when she was 5 years old, were as follows:—Height 55 cm. Head: Maximum antero-posterior diameter 129 mm.; transverse diameter 105 mm.; minimum frontal diameter 51 mm.; bi-zygomatic diameter 75 mm.; maximum horizontal circumference 39 cm. On another page he states her height at age of 5 was 65 cm. and weight 1·5 kilogs. (Bibl. No. 196, p. 215, Bibl. No. 322, p. 369, and Bibl. No. 214, p. 276.)

Fig. 729. *Moreno's Case*. This case appears to be the same as that described by José de Antelo in *La Revista d'Antropologia*, T. II. 1875, but there is no reference to Antelo in Moreno's paper. I. 1 and I. 2, were natives of Pilas, near Seville, they were robust and healthy but were the descendants of many consanguineous marriages and had many consanguineous marriages amongst their relatives. Amongst their collateral relatives there appear to have been four females, two sisters in one branch of the family and two sisters in another branch who were either dwarfs or nearly dwarfs. Moreno mentions them and had apparently seen them, but he does not describe them in this paper, nor does he define the relationship between them and the two dwarfs described below. He says they were natives of the same village and members of the same family. He also states that in all the cases there was either a normal birth or births between the dwarfs. I. 1 and I. 2, had 11 children, II. 1—11, of whom nine were tall and healthy and the other two, II. 9 and II. 11, Gabriel and Pedro Benitez Campos, were dwarfs. II. 9, Gabriel, was aged 28. When born he was more robust than the average child, he was breast-fed for a year and had no illness during this time. When seen his skin was dry and flaccid, his complexion pale brown, and his face though animated was like that of an old man. His hair was dark chestnut; he was not handsome either in face or body, but the whole body was developed in proportion except the hands and feet, which appeared a little large. His voice was hoarse as when in a state of change. The testicles were undescended, the penis small. He had no sexual instincts, was gentle and affectionate in character and devoted to his brother Pedro. His intelligence was puerile and very limited and he occupied himself looking after pigs and smoking and drinking brandy. II. 11, aged 25, had a sadder and older looking face. His voice was hoarse, his genital organs in a similar condition to those of his brother, II. 9, his character was reserved and taciturn. He had been breast-fed for only eight months, for his mother became pregnant again and for four or five months he had insufficient nourishment and according to the father suffered from intestinal disorder, ascites, at this time. Moreno calls it "hidropesia ascitis." Neither dwarf had any trouble in dentition and both had retained some of their milk teeth.

				Gabriel	Pedro
<i>Measurements:</i>					
Weight	...	...	...	39½ lbs. ¹	34 lbs. ¹
Height	...	...	...	97 cm.	94 cm.
Head: Antero-posterior diameter	...	...	...	17·07 "	17 "
Occipito-mental	...	...	...	19 "	18 "
Bi-parietal	...	...	...	15 "	13 "
Bi-temporal	...	...	...	10 "	10 "
Fronto-mental	...	...	...	12 "	12 "
Sub-occipital bregmatic diameter	...	...	...	15 "	10·05 "
Chest: Bi-acromial	...	...	...	20 "	20 "
Dorso-external	...	...	...	13 "	13 "

Moreno says these dwarfs were neither cretins nor imbeciles, and the cases are probably ateleiotic. (Bibl. No. 157, p. 157, etc.)

Fig. 730. *Hecker's Case*. I. 2, born at Villmar, was a very strong, short and thick but well-proportioned man, with a broad chest, short neck and thick head. He had been always healthy except for having once had intermittent fever. He was in comfortable circumstances and diligent and clever at his business. He had been twice married. Hecker says that II. 13, Margaret Leonhard, was the eleventh living child of her father and the fifth living child of her mother. Therefore there were apparently six children of the first marriage alive, II. 1—6, and perhaps others had died. Nothing is said about these six children, so presumably they were normal. I. 3, aged 40, the second wife, was well built and flourishing and had never had any serious illness. She was an excellent mother and housewife. She was slightly hysterical. Not related to her husband. She evidently had five children alive, but II. 8 was dead, so that II. 9—11, were alive and possibly she had had other children who had died and others

¹ Spanish.

again who were alive and younger than II. 13. All the living children of this marriage except II. 13 were healthy and well proportioned. II. 8, the first child of the second marriage, a boy who died soon after birth was according to the account of the parents much the same as II. 13 at birth but not quite so small. I. 3, noticed nothing peculiar during her pregnancy with II. 13, the confinement was very easy. The exact measurements of the child at birth were not known, as the parents were ashamed of her and would not show her, but the father said he could cover the whole body with his two thumbs placed together, so she was probably about 9" (Zoll) long and may have weighed about $\frac{3}{4}$ of a pound (Pfund). She was born May 16, 1840, and was breast-fed, but got too much milk and for 18 months had almost constant diarrhoea. Hecker saw her first when about 6 months old. She was about as long as a shoe and $1\frac{1}{4}$ pounds (Pfund) in weight. Her head was about the thickness of a hen's egg and both fontanelles were closed, they were said to have been closed at birth. Hecker saw her constantly after this. Her mental development was rather backward, but her senses were acute. In 1846 (?) the following measurements were made, in Parisian 'Zoll':—Antero-posterior diameter of head 4". Transverse diameter of head $3\frac{1}{4}$ ". Distance from chin to external occipital protuberance $5\frac{1}{4}$ ". Distance between shoulders $5\frac{1}{4}$ ". Diameter from middle of chest to the corresponding point of the spinal column $3\frac{3}{4}$ ". Distance between the iliac crests 5". From pubis to the first vertebra of the sacrum $3\frac{1}{4}$ ". Length of arm from the armpit to the tip of the middle finger $8\frac{1}{2}$ "; lower limb from the great trochanter to the heel 13". Distance between trochanters 5". Weight of body without clothes (bürgerliches Gewicht, das Pfund zu 32 Loth) 11 lbs. She was a well-proportioned dwarf. (Bibl. No. 89, p. 48.)

Fig. 731 a. *Maass' Case II.* I. 1, was a railway station assistant, and he and his wife, I. 2, were normal, as were also five of their children, II. 1, and II. 3—6. II. 2, Helene Gabler, was born Nov. 15, 1874, and so was nearly 20 years of age when seen, she was 106 cm. in height. She had a normally proportioned body but looked like a child of 6. Her face was pretty and intelligent, with blue eyes. She was the second of the family, and, according to her mother, never grew after 6 years of age. The mother said her sexual development was that of a child of 6. Her voice was childish. (Bibl. No. 297, p. 364.)

Fig. 731 b. *Gilford's Case IV.* I. 2, who died aged 78, was only about 120 cm. in height. He was exhibited as a dwarf in shows for 21 years, part of the time being with Robert Hales, the well-known Norfolk giant. His brother, I. 1, was a tall man, who was in the police force in London. I. 2, married I. 3, of ordinary stature, and had two children, II. 1—2. II. 1, aged 38, unmarried, is said to have been a small child, "like a doll" at birth. She continued growing until she was 13 or 14, and definitely ceased growing at 16, about a year after menstruation began. She is a lively woman of good intelligence, the mistress of a country post and telegraph office. She wears gloves of 00 size and shoes of "children's sevens." She looks healthy and shows a tendency to obesity. Her features are small; her face is inclined to flatness and the type is childish. She resembles II. 2 in appearance. The hair is abundant, and the nails delicate and well formed. The teeth are crowded; the lower incisors seem smaller than usual; many teeth are absent or decayed, and the last molars have not erupted. The knuckles of the hand are prominent and the lobules of the ear almost absent. The head is flattened at the top and almost cone-shaped, with the rounded apex of the cone in front. The thyroid gland is of fair size in proportion to the body. Pubic and sexual hair are abundant and the breasts of fair virgin development. As far as one can judge the digestive, urinary and generative organs are normal. II. 2, brother of II. 1, aged 36, is a boot rivetter, earning 15s. a week. He was of the usual size at birth, but nearly bled to death from some defect in the tying of the umbilical cord. It was first noticed he was not growing when he was about a year old, but he thinks he grew more quickly at 14 or 15 and ceased altogether at 17 or 18. He had inflammation of the lungs when 11 years old, but has had good health since. Puberty set in when he was between 16 and 17, but he says his facial hair did not grow thickly until he had turned 20. He married at 25, II. 3, and has had seven children, III. 1—7. Four died when about 3 months old, one of whom was a male, and three were females. All four are said to have been dwarfs, but of this one cannot be positive. Of the three now living: III. 5, is a dwarf boy aged 10, and III. 6—7, are well-developed girls. II. 2, has, like his sister, a cone or pyramid shaped head with the angles worn down and rather flat at the top. Its circumference is that which is usual at about 12, while his height is that of a boy of 10. He is of average intelligence, talkative, and of good disposition. His teeth are all of the permanent set, and are crowded and irregular, many of them being decayed or absent. Of the molars only the first have erupted. His digestive, urinary, circulatory and reproductive organs seem to be normal. The thyroid gland is of proportionate size. He is of fair muscular development and can work all day without getting tired. A radiograph of his hand shows that ossification is completed and that the bones are thicker than is usual in those of his age. III. 5, aged 10, was like other babies at birth and it is not known when growth became abnormal. The father thinks he noticed that his boy was not so big as he should be when he was about a year old. Since then he has grown very slowly, but no measurements have been taken. A normal sister of 6 years is taller than he. The head is shaped

like that of II. 1 and II. 2, its circumference is that which is usual at 2. The face and the proportions of the whole body are like those of a child of about 4. He has passed the second standard at school and seems to be well behaved and of good intelligence. The thyroid gland is present and apparently normal. The teeth are of the first dentition, with the exception that the two mesial lower incisors are just appearing through the gums, one milk incisor being absent and the other loose. The organs are normal with the exception of the reproductive, the scrotum being like that of an infant, while the testes cannot be felt; but the penis does not seem to be quite so backward in development as the testes and scrotum. He is a cryptorchid. A radiograph shows that his epiphysial and carpal ossification resembles that which is customary at 5. Gilford calls II. 1 and II. 2, cases of sexual ateleiosis, and III. 5, a case of asexual ateleiosis. Measurements of the three cases are as follows:

	II. 1 Age 38	II. 2 Age 37½	III. 5 Age 12		II. 1 Age 38	II. 2 Age 37½	III. 5 Age 12
					cm.	cm.	cm.
<i>Measurements:</i>				<i>Measurements:</i>			
Weight (kilogs.)	—	33·11	16·32	<i>Upper limb:</i> Across extended arms	—	132	95·5
	cm.	cm.	cm.	Acromion to external condyle	16·1	22	15·5
Height	129·5	132	95·3	External condyle to styloid process	15·5	20·5	13·8
Sole of foot to fork	—	57·8	42·5	Styloid process to knuckle of middle finger	5·6	7·5	5·3
" " pubes	—	62·8	46·4	Middle finger	6	8·7	7
" " navel	—	72·4	54·2	<i>Lower limb:</i> Trochanter to lower edge of patella	29·4	33	24·5
" " top of sternum	—	1·06	80·3	Lower edge of patella to internal malleolus	25	27·7	20·2
<i>Face:</i> Vertex to base of nose	—	15·4	12·7	Internal malleolus to ground	4	5·3	4·5
Vertex to chin	—	17·5	16·8	Heel to first metatarsal joint	11	14·8	10·7
<i>Head:</i> Diameter	13·7	14·8	13·8	Great toe	4	5	3·7
Length	17·1	18·4	16·7	Between antero superior iliac spines	18·6	—	—
Circumference	49·5	53·2	51				
<i>Chest:</i> Circumference	67	75	—				

Ages given in this table of measurements differ from ages in text. Photographs of two of the cases are given in original. (See Bibl. No. 664, p. 596, where a good photograph of II. 2 and III. 5 is given. The measurements are from the *Brit. Med. Journal*, 1904, Vol. II. p. 914 except the height of II. 1 which is from No. 664.)

Fig. 732. *Hitschmann's Case.* I. 1, and I. 2, were normal and not related, they did not remember any deformities or dwarfs in their families. They had three normal children, II. 1—3, of whom II. 3, a son, died aged 35. II. 4, aged 35, was healthy as a child, but the mobility of his right shoulder was limited. He grew like other children till the age of 5, then much more slowly, but he continued to grow till his 25th or 26th year. He attended school and learnt like other children, then joined a Lilliputian troupe of actors and had since been a variety singer. For the last half year he had suffered from violent headache in the occiput and temples. His height was 118 cm., he was regularly built, his head being in proportion to his body; the circumference of the head was 52 cm. The length of the upper arm was 22 cm., that of the forearm 19 cm. His figure was slender [gracil], his gait slow, but not tottering. He was beardless but there was a little hair in the axillae. His voice was like that of a child. A long account is given of his right arm which was defective in function. Probably a case of ateleiosis. (Bibl. No. 340, p. 663.)

Fig. 733. *Aldrovand's Case.* Ferdinando Cospe of Bologna had two dwarfs, brother and sister, II. 1—2. They were the children of needy parents, I. 1 and I. 2, who were of ordinary height, and were peasants living in the Commune of Bagnarola. The son II. 1, was 26 years of age, and height about 31". The daughter II. 2, was aged 23, and her height was about 29". Both were of elegant proportions and much admired. Taruffi translates the heights thus: II. 1, 32 oncie = 101·1 cm. in height. II. 2, 30 oncie = 94·8 cm. in height. The Latin is as follows "Nanus nomine Sebastianus jam annum sextum supra viginti natus altitudinem trium dodrantium cum dimidio vix superat. Nana alterius soror nomine Angelica jam vigesimum tertium agit annum et tamen ejus altitudo tres tantum dodrantes et duas uncias aequat." (Bibl. No. 8, p. 602.)

Fig. 734. *Virchow's Case:* "Dobos Janos." This case was described by Virchow on April 27, 1892, before the Medicinische Gesellschaft of Berlin. The same dwarf was then described by Daniel and

Philippe (*Extrait de Clinique*, August 2, 1902, Brussels), by Lardennois, Bibl. No. 454, and also by von Hansemann. It is the account of the last which is given here. I. 1 and I. 2, were presumably normal as no statement to the contrary is made. The number of their children is given somewhat indefinitely. The account states that II. 5, aged 22 nearly, had still 12 brothers and sisters in 1902, therefore apparently 13 children were then alive, and II. 7, II. 10 and II. 12, were dead, which would make 16 children, but possibly there may have been others. II. 5, was born in March, 1881, and was 11 years of age when seen by Virchow, who states he weighed 500 grammes at birth. He was the fifth child and the first dwarf in the family, and was born at full term after a normal pregnancy and was unusually small at birth. The mother, I. 2, afterwards bore three other dwarfs of the same kind, II. 7, II. 10 and II. 12, after normal pregnancies. These were all unusually small at birth. II. 7, died aged 2 years, II. 10, died aged 10 months, and II. 12, died aged 10 weeks. Between these births were some of the normal children. With the exception of his small size and swollen knotty finger-tips, II. 5 had no deformity. Though his head appeared extraordinarily small it was in proportion to the rest of his body. Rieger (*Sitzungsbericht der Würzburger phys. med. Gesellschaft*, 1895), calculated the weight of his brain at about 600 grammes, he then weighed 13.2 kilos. The head could not be said to be too small for his body, he was not microcephalic. He spoke Hungarian and some French and German, but had never been taught to read and write; he showed no trace of idiocy and conducted himself as a man. He had a sprouting if not a luxuriant beard, and the pubic hair was well developed. He had bi-lateral cryptorchism. His voice had become deeper than formerly and the thyroid cartilage was as prominent in the neck as in an adult man. The cephalic index was not much altered, it was a little over 81, it had formerly been nearly 81.

	von Hansemann Age 22	Virchow Age 11		von Hansemann Age 22	Virchow Age 11
Height of crown of head	114.5 cm.	92.6 cm.	Head: Maximum horizontal		
" " shoulder	95.0		length	135 mm.	129 mm.
" " elbow	75.0	58.4 "	Maximum breadth	110 "	104 "
" " wrist	57.5	43.6 "	Height of ear	87 "	86 "
" " middle finger	45.5	33.2 "	Horizontal circumference	395 "	374 "
Length of right hand	12.0	10.0 "	Height of nose	47 "	39 "
Breadth " "	7.0	5.0 "	Length "	45 "	38 "
Length of right foot	15.2	12.5 "	Breadth "	23 "	20 "
Breadth " "	6.0	5.1 "			

The glabella-inion line was 139 mm. the vertical height (Calottenhöhe) 75 mm. which gave a height index of 53.8 the index of a well-formed man. (Bibl. No. 401, p. 1209.) Lardennois says Dobos Janos was the fifth of nine children, that his parents and five brothers and sisters were normal, and that three brothers were dwarfs and died young, so presumably II. 7, II. 9 and II. 12 were males. Dobos Janos is stated to be aged 22, height 115 cm. and weight 18 kilos. The rest of Lardennois' description corresponds on the whole with that of von Hansemann. (Bibl. No. 277 b, p. 517, No. 401, p. 1209 and No. 454, p. 121.)

Fig. 735. *Quetelet's and Bellefroid's Case*. This case was communicated to Quetelet by Dr Bellefroid. Quetelet has compared the measurements with those of the celebrated dwarfs, Tom Thumb and Admiral Tromp: see Table, p. 519. I. 2, normal, of medium height, married twice, by her first husband, I. 1, she had two normal sons, II. 1—2; by her second marriage, with I. 3, she had three children, II. 3—5, of whom two, II. 3—4, were dwarfs, and the third, II. 5, was too young to know whether she would be a dwarf or not. II. 3, aged 11½, was born 1838, at the village of Kerkum near Binckum in the neighbourhood of Tirlémont. He was born at term, and stopped growing at age of 2½ years, and had developed little since then. He never had any serious illness but frequently had colds. He appeared well built with limbs normally proportioned to size of body, the head alone was a little large. He was restless with sharp eyes and rather sallow complexion. II. 4, was born five years later than II. 3. II. 5, aged 17 months, appeared to be perfectly formed, but as her brothers did not stop growing till 3, a decided opinion with regard to her normality could not be formed. (Bibl. No. 99, p. 344.)

				Tom Thumb	Admiral Tromp	Kerkum Dwarf	Normal Child
<i>Measurements:</i>							
Age	...	...	...	11 years (14 years?)	11 years	11½ years	From 13—14 months
Total height	...	...	...	71.0 cm.	72.8 cm.	78.6 cm.	71.0 cm.
Span	...	...	...	66.0 "	70.4 "	62.0 "	69.8 "
Height of head	...	...	...	15.3 "	14.8 "	19.0 "	15.6 "
Circumference of head over eyebrows	...	...	...	44.2 "	50.5 "	49.0 "	43.8 "
From crown of head to clavicles	...	...	...	17.5 "	18.0 "	19.8 "	16.8 "
Distance of shoulders between the acromion processes	...	...	...	20.2 "	19.5 "	18.0 "	17.4 "
Circumference of shoulders at the acromion processes	...	...	...	50.0 "	48.5 "	45.0 "	43.0 "
Circumference of hips	...	...	...	47.8 "	52.0 "	50.0 "	44.7 "
Length of upper limb from the acromion process	...	...	...	24.5 "	27.2 "	34.3 "	28.4 "
Length of hand	...	...	...	7.5 "	8.8 "	8.6 "	8.5 "
Length of foot	...	...	...	10.5 "	10.5 "	11.0 "	11.1 "
Breadth of hand	...	...	...	4.4 "	4.7 "	5.2 "	4.3 "
Breadth of foot	...	...	...	4.2 "	4.4 "	6.3 "	4.6 "
Length of the lower limb from the patella	...	...	...	17.5 "	17.8 "	20.3 "	17.3 "
Length of the lower limb from the bifurca- tion to ground	...	...	...	26.5 "	27.4 "	31.7 "	25.4 "
Length of the lower limb from the tro- chanter to ground	...	...	...	30.0 "	29.6 "	36.0 "	30.0 "
Circumference of calf	...	...	...	15.7 "	16.8 "	17.0 "	15.2 "
Length of ear	...	...	...	4.7 "	4.7 "	5.2 "	4.5 "

Fig. 736. *Manouvrier's Case I.* I. 1, was robust, well formed and non-alcoholic. I. 2, was small but well formed. The account does not state how many other children she had. II. 1, aged 23, Auguste Tuillon, was born in the village of Esmonlières, Canton de Faucogney (Haute-Saône), March 28, 1873. His mother was never ill during her pregnancy with him. He was born at term, was in good health and of normal size at birth. He walked at age of 13 months, at age of 1½ years he had small white pimples over his hands and feet so thick one could not put the head of a pin between them and the nails on his hands and feet fell off (Cheiropompholyx). At 3, he fell down a flight of stairs from the first story to the ground floor, but apparently was not injured. His mother noticed that he stopped growing at the age of 4½, and then had "le carreau" i.e. a very large and very hard abdomen and was much constipated. Manouvrier calls this illness "intestinal tuberculosis." He went to the primary school regularly and got his certificate for reading, writing, elementary arithmetic, the decimal system and elementary history and geography. At the age of 20 he was called as a conscript, his height was then 97 cm. and weight 17 kilos. In a later paper Manouvrier stated his height at this time was 99.7 cm.—there is apparently some discrepancy. His general formation resembled that of a child. He had a large skull and a small face; his limbs were thin and short relatively to the trunk, the abdomen was prominent and the skin without hair everywhere, even the pubes. At a distance he looked like a child, but when close wrinkles were visible. No part of his body was deformed, if the weakness and smallness of his muscular system be left out of account. The hands, feet and ears were normal in form. He had no wisdom teeth, the size of his teeth was proportional to the gums. He walked easily and could walk several kilometres without fatigue, but walked with legs rather far apart, unless he was thinking about it and then he walked correctly. He had no trace of rickets. The fingers were in normal proportion to the size of the hands.

Measurements. Sitting height 56.8 cm. Bi-acromial breadth 21.4 cm. Bi-trochanteric breadth 19 cm. Length of ear 5.8 cm. Width of ear 3.2 cm. Head: maximum antero-posterior diameter 178 mm. Metopic antero-posterior diameter 178 mm. Maximum transverse diameter 148 mm. Vertical superauricular diameter 127 mm. Minimum frontal diameter 102 mm. Horizontal circumference 53 cm. Manouvrier saw Tuillon again at the age of 24½ and said his height was then 103 cm. (Bibl. No. 324, p. 265, Bibl. No. 330, p. 655.)

Fig. 737. *Manouvrier's Case II.* I. 1 and I. 2, were normal. II. 1, aged 23, was their first child born at term, her weight was normal, viz. 3.70 kilos, the head and fontanelles were also normal

at birth. The mother had noticed retardation in growth since birth. II. 1, at 23, was 124 cm. in height, her proportions were regular, she had large breasts and apparently was a fully developed woman, except for a pubes without hair, but her mother I. 2, whom she closely resembled, differed little from her in that respect. Her head was very large relatively to her body and her intelligence was normal. She was known as "Princess Blanche." *Measurements.* Height above ground of crown of head 124 cm.; point of chin 106.7 cm.; of jugular notch 100.6 cm.; of nipple 85.3 cm.; of umbilicus 75.1 cm.; of upper margin of symphysis pubis 63.9 cm.; of antero-superior iliac spine 69.0 cm. Sitting height 64.3 cm. Limbs: height above ground of external extremity of acromion 100.6 cm.; of elbow joint 77.2 cm.; of styloid process of radius 63.0 cm.; of distal extremity of middle finger 47.8 cm.; upper edge of great trochanter 65.0 cm.; of knee-joint 33.1 cm.; of apex of external malleolus 3.7 cm. Breadths: Bi-acromial 25 cm. Bi-humeral 27.1 cm. Bi-nipple 16.6 cm. Minimum waist 19.1 cm. Internal bi-iliac (iliac spines) 20.8 cm. External bi-iliac (iliac crests) 27.4 cm. Maximum bi-trochanteric 27.4 cm. Hand: total length 13.8 cm. Maximum width (heads of metacarpals) 6.25 cm. Free length of middle finger 6.05 cm. The length of the index finger differed little from that of the middle finger, but was 10 mm. longer than the ring finger which appeared to be shortened as was also the little finger. Foot: total length 18.1 cm. Post malleolar length 4.35 cm. Maximum width (heads of metatarsals) 6.5 cm. The great toe was the longest, the others decreased in size regularly. The form of the foot was normal. Circumferences: neck 24.7 cm.; thorax above breast 64.6 cm.; waist 54.5 cm.; thigh at the gluteal fold 36.2 cm.; thigh above the knee 26.6 cm.; calf maximum 22.2 cm.; supra-malleolar 15.8 cm.; middle part of upper arm 16.4 cm.; maximum of forearm 16.8 cm.; minimum of forearm at wrist 11.2 cm. Head: maximum antero-posterior diameter 16.55 cm.; metopic antero-posterior diameter 16.6 cm.; maximum transverse diameter 14.45 cm.; maximum vertical diameter 11.5 cm.; minimum frontal diameter 9.0 cm. Cephalic index 87.3; vertical index 74.2. Face: bi-zygomatic width 10.4 cm.; internal bi-ocular width 2.7 cm.; external bi-ocular width 8.6 cm. Forehead (hair to eyebrows) 4.2 cm. Height of nose 3.65 cm.; width of nose 2.8 cm. Mouth (oral cleft) 3.7 cm.; length of upper lip 1.8 cm., of lower lip 1.3 cm.; bi-labial mucus 1.2 cm. Length of ear 4.95 cm.; width of ear 3.35 cm. (Bibl. No. 330, p. 659 and No. 345, p. 111.)

Fig. 738. *Chavlovsky's Case.* In the discussion on Manouvrier's paper on Auguste Tuillon, M. Th. Volkov mentioned some Russian dwarfs, among them a pair of dwarfs exhibited before the Society of Anthropology at St Petersburg by Prof. Chavlovsky. No date was given. Nothing was said about the parents, I. 1 and I. 2, except that they were normal. II. 1, aged 26, was normal until the age of 6, but his growth stopped (?) after an injury to his head. His height was 104 cm. II. 2, his sister, aged 18, was 96 cm. in height, and had been very small from birth. Both were developed in good proportion, and all their physiological and psychological faculties were completely normal. (Bibl. No. 324, p. 288.)

Fig. 739. *Volkov's Case I.* Practically no details are given of these dwarfs. Nothing is stated with regard to their parents. II. 2, Serge Bachirov, aged 34, was from the province of Riazan and was 74 cm. in height. His development was quite normal, he was a petty clerk and had married another dwarf, II. 3, aged 23 and 70 cm. in height, who was daughter of a noble landowner. She was also completely developed, clever, and a good housekeeper and worker. (Bibl. No. 324, p. 288.)

Fig. 740. *Ranke and Voit's Case.* This is an account, in 1884, of Frank Flynn (General Mite) and Millie Edwards. I. 1 and I. 2, were healthy and of average size. I. 2 was aged 17 when II. 1, her first child was born. She afterwards had five normal children, II. 2—6, of whom the eldest, II. 2, was aged 14, and II. 6 was born October, 1883. II. 1, aged 16, according to his father weighed 2 lbs. at birth and his mother nursed him for 18 months. At 15 months old he began to walk and at 2 years to talk. His father said that in September, 1876, he measured 62.23 cm. (24½") and weighed 4812 gms. (10½ lbs.). He could neither read nor write, except his name, but he had a good memory and was what Americans call "smart." He had bad teeth and no pubic hair. He had inflammation of the lungs twice and in 1883 he had whooping cough. *Measurements.* Total height 82.4 cm. Height when sitting 45.2 cm. Height of trunk to 7th cervical vertebra 31.5 cm. Breadth of shoulders from acromion to acromion 17.5 cm.; of hips 13.3 cm. Length of head 145 mm. Breadth of head 115 mm.; face (Jochbreite) 100 mm. Height from upper edge of auditory meatus to crown of head 93 mm. Maximum circumference of skull 42 cm.; chest in inspiration 48 cm. Minimum circumference of chest in expiration 46 cm. Total length of upper limb from acromion to tips of fingers 32 cm. Length of the upper arm 11 cm.; forearm 11 cm.; hand 10 cm. Total length of lower limb measured from trochanter 41.5 cm. Length of thigh 21.5 cm.; leg 15.8 cm. Height of foot from malleolus to sole 4.2 cm. Length of foot 11.5 cm. In 1884, II. 1 married II. 8, Millie Edwards. She was born in the State of Michigan, September 1st, 1871, so was aged 13 in 1884. Her mother, I. 4, aged 36 in 1883, was first married at the age of 19 to I. 5, and had four normal children, II. 15—18. She remained a widow two years and then married I. 3. II. 8, was the first child of this marriage, afterwards I. 4 had a miscarriage in the third month, II. 9, and since that had four healthy normal children, II. 10—13, the youngest, II. 13, was aged 8 months in 1883. II. 8, in October, 1883, measured 72 cm. in her stockinged feet, and weighed with her clothes 6601 gms.

She had bad teeth, the front incisors were almost entirely decayed. She showed no trace of rickets. Her attendant stated she had no pubic hair. No measurements are given. Gilford (Bibl. No. 664, pp. 578—9) gives instructive pictures of General Mite and Millie Edwards. (Bibl. No. 216, p. 229.)

Fig. 741. *Lohlein's Case*. No statement is made with regard to I. 1. I. 2, was a small dwarf person 136 cm. in height, of regular build and with slightly curved extremities. She was healthy in youth, but much addicted to self-abuse; had done much hard work. At the age of 29, in the 7th month of her pregnancy, she had a sanguinolent foetus. She came into the Institution again for a second confinement. The following measurements were taken at the second reception:—External conjugate 160 mm. Diagonal conjugate 85 mm. Interspinous 180 mm. Intercrestal 210 mm. Intertrochanteric 245 mm. External oblique diameter 170 mm. At this second confinement she bore a female 47 cm. long who weighed 1835 gms. and died during birth. The mother recovered and left in 10 days. (Bibl. No. 163, p. 41.)

Fig. 742. *Levi's Case I*. II. 5, Santo Magro, aged 49, was born at Randazzo, Sicily, near Etna. His height was 106 cm. Weight 23·5 kilos. He and his son, III. 1, were exhibited in Paris, 1909. His parents, I. 1 and I. 2, were normal and died of old age. I. 1, was neither alcoholic nor syphilitic. I. 2, had four normal children, II. 1—4, two died when adult of acute diseases, two were still alive. No case of dwarfism was known in the family. II. 5, born at term, was extremely small at birth, he was breast-fed and his physical development was normal. He was lively and intelligent but uneducated. His sexual development was normal. At the age of 14 he had hair on pubes and axillae, at 16 had sexual intercourse and at 20 married a normal woman, II. 6, aged then 18. She had died two years ago of pneumonia. After 18 months of married life a boy, III. 1, was born, who was extremely small at birth; two years later a girl, III. 2, was born even smaller than her brother, but like him normal except for size. She died, aged 10, of croupy pneumonia. For about 15 years II. 5, had been inclined to drink too much. His body was well proportioned, the cranium too large relatively to the body, and the last phalanges of the fingers were deformed. There was no trace of rickets, the genital organs were those of a normal adult, the muscular system was perfect. The nose was depressed. He had bi-lateral inguinal hernia. A long description of him is given, but there appears to be no abnormality except his size and the malformation of the last phalanges of his fingers. The measurements were:—Thoracic circumference at nipples 68 cm. Abdominal circumference at umbilicus 69 cm. Length of sternum 12 cm. Distance from the superior limit of the pubis to the ground 47 cm.; antero-superior iliac spine to the ground 48 cm.; great trochanter to the articular line of the knee 20 cm.; this point to the external malleolus 24 cm. Maximum length of foot 15 cm. Total length of upper limb from acromion to tip of medius 39 cm. Distance from acromion to tip of olecranon 15·5 cm.; olecranon to radial styloid process 16 cm. Maximum length of hand 11 cm. Maximum circumference of cranium 50 cm. Bi-temporal diameter 140 mm. Maximum bi-parietal diameter 152 mm. Bi-zygomatic diameter 139 mm. Cephalic index 90. III. 1, Giuseppe Magro, aged 12½, height 77 cm., weight 9·1 kilos, was extremely small at birth. He was breast-fed; his development was regular and gradual and always in proportion to his small size. He had no education but was intelligent. He had no sign of puberty and was perfectly proportioned. Penis that of a child of 4, he had bi-lateral cryptorchism. There was no psychical deficiency and nothing abnormal was shown by radiographic examination. There is a long description of him. The measurements were:—Height of pubis from ground 35 cm. Maximum thoracic circumference 45 cm. Maximum abdominal circumference 42 cm. Length of sternum 8 cm.; from tip of acromion to tip of medius 31 cm.; from acromion to tip of olecranon 12·5 cm., from olecranon to radial styloid process 11 cm. Maximum length of hand 7·5 cm. Length of lower limb from antero-superior iliac spine to heel 38 cm.; from great trochanter to articular line of knee 17 cm.; from this point to external malleolus 17·5 cm. Maximum length of foot 11·5 cm. Maximum circumference of skull 46 cm. Bi-parietal diameter 143 mm. Bi-temporal diameter 143 mm. Bi-zygomatic diameter 134 mm. Cephalic index 91. (Bibl. No. 640, p. 542.)

Fig. 743. *H. D. Smith's Case*. II. 1 and II. 2, both normal, had four children, all of whom were normal, as were also their descendants except III. 7, a dwarf, type uncertain, who married a normal woman, II. 8, and had 14 children, IV. 3—4, of whom only one, IV. 4, was a girl; no note is made of their size, so presumably they were normal. II. 3, sister of II. 2, had at least three sons and three daughters, all rather tall. One son, III. 9, married III. 10, a normal woman, and had several children, IV. 5—6, of whom IV. 5 was an ateleiotic dwarf, a medical man of ability and character (unpublished).

Fig. 744. *Benzenger's Case*. The Kotesky Family. II. 1, was tall and strong; he died, aged 44, of "fièvre chaude." His wife, II. 2, aged 80, was alive. It is stated that the grandfather of III. 8 was tall and strong, but does not specify which grandfather. It also states III. 8 remembered three of his six uncles, but again does not specify whether they were maternal or paternal uncles, therefore they have not been entered in the pedigree. II. 1 and II. 2, had seven children. III. 1—4, were living, all tall, and their children, IV. 1, were of medium height. III. 5—6, were also tall and alive, III. 6 had 11 children, IV. 2, all tall. III. 8, aged 45, height 1·79 metres, was robust, healthy and of great muscular power. He was born at Kanef, province of Kiev, had, according to his mother, cholera at 8 years of age, of which he

nearly died, and had no serious illness since, but suffered from a species of aphasia the result of a fall on the ice two months before. His wife, III. 9, was not related to him, she was of medium height, 1.54 metres. Height of her father, II. 4, was 1.55 metres. Her mother, II. 5, was tall, and according to her the grandparents, I. 1, I. 2, I. 3 and I. 4, were healthy and of average height. II. 4 and II. 5, had had eight children, III. 9—16, of whom only two were alive. No dwarf had ever been known in the family. III. 8 and III. 9, had nine children, IV. 3—11, all breast-fed. IV. 3 and IV. 10—11, died in their first year. IV. 8, a girl, aged 6 years and 10 months, was normal, her height was 1.16 metres. IV. 9, aged 4 years and 2 months, could not be called a dwarf. Her height was 1 metre and she was still growing. IV. 4—7, were dwarfs. IV. 4, was aged $16\frac{1}{2}$, height 97.1 cm.; IV. 5, aged 14, height 102 cm.; IV. 6, aged 11 years and 10 months, height 95.5 cm.; IV. 7, aged 9, height 92 cm. All these children had ceased to grow in their 4th year, all were of the dwarf type, had large heads, large abdomens, short limbs, flaccid muscles, and were prematurely aged with some facial wrinkles. IV. 4, had some grey hairs. Their skin was fresh and rosy, their hair dark chestnut and eyes light chestnut. Their normal sister, IV. 8, was blonde with light eyes. The intellectual abilities of these dwarfs were remarkable. They had never attended school, but could read and write Russian and read Slavonic. They knew sacred history and a number of prayers, psalms, fables and songs. IV. 7, was an agile dancer, and the girls, IV. 5—6, excelled in manual work, sewing and embroidery. They had also learnt French and German, the violin and dancing. IV. 4, was the most apathetic, but at the age of 10 or 12 he had been as lively as IV. 7. They appeared to have no wills of their own. The original account of this family was published by Dr Benzenger at Moscow, but he had lost sight of them for more than a year. M. Th. Volkov, in the discussion on Manouvrier's paper, Bibl. No. 324, mentioned the family Kotesky, and said they formed a troupe of dramatic artists who gave representations in all the towns of S. Russia. He gave no family details, but gave the heights and ages of the four dwarfs, and evidently either he or Bronghiart has made mistakes with regard to height. Judging from the ages given, Volkov's measurements were made about 10 years later than Bronghiart's.

	Bronghiart		Volkov	
	Age	Height	Age	Height
IV. 4	$16\frac{1}{2}$	97.1 cm.	28	90 cm.
IV. 5	14	102 "	25	92 "
IV. 6	$11\frac{10}{12}$	95.5 "	20	89 "
IV. 7	9	92 "	19	90 "

For portraits of these dwarfs see our Plate KK (75). (Bibl. No. 232, p. 179, and Bibl. No. 324, p. 288.)

Fig. 745. *Geoffroi's Case*. No statement is made with regard to I. 1 or I. 2, except that I. 2 was aged 35 and had three children, II. 1—3, of whom II. 1, Nicolas Ferry, otherwise Bébé, was the eldest. When born he was about 8" or 9" (pouces) long and weighed 12 ounces (12 onces) or $\frac{3}{4}$ lb. (3 quarterons). He was born Nov. 13, 1741, after a labour which lasted for 48 hours. On July 25th, 1746, he was carefully measured by M. Kast, physician to the Queen of Poland. He was then made in miniature like a man of 20, which made M. Kast conjecture he would grow no more. He was 22" (22 pouces) long and weighed when stripped 9 lbs. 7 oz. (9 livres 7 onces). All parts of his body were well proportioned, he had a pretty face, nose well made and aquiline, dark brown eyes and fair hair. He had had small-pox at 3 years of age. He was extraordinarily vivacious, never still for a moment, feared nothing and could never be dissuaded from the object he had in view. He appears to have had some memory, but not as much as a normal child of his age. His voice was the voice of a child a year old. His knees, especially the R. one, were bent out a little (*genu varum*), which diminished his height by $\frac{1}{2}$ " ($\frac{1}{2}$ pouce). Manouvrier (*Mémoires de la Soc. d'Anth. de Paris*, T. 4, pp. 347—402) gives the following measurements for Bébé, whose skeleton is in the Musée d'Histoire Naturelle in Paris: see our Plates Z (39—40) and RR (98):—Height 100 cm. Length of femur 24.52 cm.; tibia 17.61 cm.; humerus 20.38 cm.; radius 12.17 cm. Buffon, Bibl. No. 33, gives a very complete table of measurements. (Bibl. No. 20, p. 44.)

Fig. 746. *Taruffi's Case I*. Taruffi says he does not know where the original of this case is to be found. No statement is made with regard to I. 1 and I. 2. II. 2, had several normal brothers and sisters, II. 1. II. 2, Caterina Pospoel, was born 1820 at Isembeck, in the neighbourhood of Brussels. She always had good health. At the age of 33 she was 91.8 cm. in height with limbs in proportion. She was thin and looked like a miniature woman of 45. She was of a bright disposition with well developed intelligence and busied herself in house and field work. (Bibl. No. 248, p. 442.)

SECTION III. DWARFS OF UNCERTAIN TYPE.

THE information given about the dwarfs in Figs. 747—841 is, in most cases, insufficient to permit of any attempt at definite classification under achondroplasia, ateleiosis, or other type. In some cases where the statures or other measurements are given, a fair guess at the nature of the dwarfism may be made.

PLATE LVI. Fig. 747. *Luigi Frank's Case*. This is the case of the Leporati family. I. 1, and I. 2, were people of tall stature, natives of Varano de' Melegari, a mountain about 24 "miglia" distant from Parma, they had five children, II. 1—5, all of whom were tall except II. 5. All their relatives were also tall. II. 5, Francesco Leporati, was born in 1730, and was a dwarf well proportioned in all parts of his body. His height was 113 cm. In his 19th year he went as page to Parma and learnt to be a watchmaker. At the age of 36 he married a normal woman, II. 6, and they had nine children, of these, three, two girls and a boy, III. 3—5, died in infancy. There were also two miscarriages, III. 1—2. II. 5, died aged 83. Of the six surviving children five were dwarfs. III. 6, aged 50, was 113 cm. in height. She had been a nun, but had left the convent. III. 8, aged 44, height 135 cm., was a watchmaker. He married twice, by his first wife, III. 7, he had four children, IV. 1—4. IV. 1—3, died young, IV. 4, who survived, was fairly tall and married. By his second wife, III. 9, aged 33 and also normal, he had four sons, IV. 6—9. IV. 6, died young. The other three were young but apparently dwarfs. IV. 7, aged 14, height 94.5 cm.; IV. 8, aged 9, height 97 cm.; IV. 9, aged 7, height 91 cm.; III. 10, aged 42, height 130 cm., was also a watchmaker, he married III. 11, aged 32, a normal woman, and had five children, IV. 10—14. IV. 10, died young. IV. 11, aged 13, was normal. IV. 12, aged 6, height 82.5 cm. IV. 13, aged 3, height 65 cm., and IV. 14, aged 1½, height 61.6 cm. were said to be dwarfs. Frank says IV. 14 looked as if he would be a dwarf. III. 12, aged 41, was 98 cm. in height. III. 13, aged 34, was normal and married. III. 15, aged 31, was 115.5 cm. in height. Scarcely ateleiosis. (Bibl. No. 67, p. xcvi.)

Fig. 748. *Mussot Arnould's Case*. It is stated that this family appeared at a fair in Saint Germain, 1779. They were Lapps. I. 1, aged 30, was only 31" (31 pouces) high (0.97 m.). I. 2, was 28" (28 pouces) high (0.756 m.). They had been married in France and their child, II. 1, was only 18" (18 pouces) high (0.446 m.). They were well made and of interesting countenances, speaking French well enough to answer questions. Quoted by Garnier, not seen in original. Possibly ateleiosis. (Bibl. No. 35, and No. 205, p. 187.)

Fig. 749. *Taruffi's Case II*. I. 1, and I. 2, were agricultural labourers in the province of Cuneo, of a good height. Taruffi says they had 13 children, seven sons and four daughters. There is evidently a mistake here of some kind, so only the eleven children have been entered. All of them attained normal height except the third and seventh sons. These were unable to follow the occupation of their parents, the third, II. 3, became a tailor and the seventh, II. 7, aged 36, travelled round with a showman. He was born at term and at age of 31 married a woman of normal stature, II. 8, and had two children, III. 1—2, who both died before they were 12 months old. He was well formed and had no trace of rickets, but his head was very large in proportion to his stature. He had a dolichocephalic skull. *Measurements*. Height 115.5 cm. Circumference of head 52 cm. Antero-posterior diameter of head 18 cm. Maximum transverse diameter of head 14.4 cm. Vertical diameter from the auditory passage to the vertex 11.1 cm. Cephalic index 80. Face from the glabella to the chin 10.5 cm., whole height of face 17.4 cm. Length of hand 12.0 cm. (Bibl. No. 248, p. 452.)

Fig. 750. *Taruffi's Case III*. No statement is made with regard to I. 1. I. 2, aged 35, had had four confinements, II. 1—4. After the fourth, her hair fell out, she had a cutaneous eruption of her hands and arms and afterwards suffered several times from affections of the mouth and throat. These symptoms were considered syphilitic. When she recovered she became again pregnant, and during pregnancy was subject to nocturnal pains in the lumbar and crural regions so went to the Maternity Hospital in Bologna in 1884. Of her children II. 1, and II. 3, appeared healthy and robust. II. 2, showed no external defect but would not take the mother's breast and died of hunger on the fifth day. II. 4, was born dead and emaciated. II. 5, came at term like the others and was born without trouble but died half hour later. The head measurements were: Occipito-mental diameter 10 cm.; occipito-frontal diameter 10 cm., bi-parietal diameter 9 cm.; bi-temporal diameter 7 cm.; sub-occipito-bregmatic diameter 9 cm.; fronto-mental diameter 8 cm.; total length 38 cm.; weight 2000 grammes. The cranial vault showed no defect but had a fine down on the skin, the face had no eyebrows, the nose was depressed at the root and a little flattened at the point. The philtrum of the upper lip was wanting in its middle and lower part, and the lower lip was not in the same plane as the upper because the mandible was shorter than usual. The edge of the lip did not turn over because the mucous membrane of the floor of the mouth extended to the alveolar margin and adhered to the middle part of the edge of the lip. The parotid and masseteric regions were

very prominent. The hard palate was cleft and the alveolar arches very deficient. The upper limbs were relatively short, the L. measured 9 cm., the R. 8 cm., and the humeral part was longer than the radial, the joints were not very mobile though the epiphyses were not enlarged. The forearms were held at R. angles to the upper arms. The L. hand had seven fingers spread out like a fan and none of them resembled a thumb or little finger. The R. hand was rather narrower and divided by a longitudinal sulcus; it had only two fingers which were relatively rather long. The lower limbs were thick and deformed, the knees bent at a right angle so that they seemed shorter than they were. The thick thighs were much abducted, the legs on the contrary were adducted and twisted in such a manner that the fibulae were found behind. The feet were in the equino-varus position, the toes webbed to the middle, the R. foot had six toes the L. five with a space of 4 mm. between the third and fourth. There were several deformities in the internal organs. There was slight scoliosis of the vertebral column with dorsal convexity to the L. and lumbar to the R. The pelvis was symmetrical. The humeri measured 45 mm. The right forearm had only a radius which resembled the letter S, in the L. both bones were present. The femora measured 47 mm., the tibiae 32 mm. The legs had the normal number of bones but the fibulae were still in a cartilaginous condition. Possibly achondroplasia with multiple abnormalities. (Bibl. No. 209, p. 663.)

Fig. 751. *Bayon's Case*. I. 1, was abnormally small and mentally defective but no measurements of him are given. He was a shoemaker in Laudenbach, near Karlstadt. No statement is made with regard to I. 2, neither is total number of offspring stated. II. 1, was well formed. II. 2, was even smaller than II. 4, and was married. II. 4, was brought to hospital in 1888, she had always been weak-minded but was showing signs of increasing mental defectiveness. She had never worked but supported herself by begging. She died in 1888 aged about 66. Bayon says this was certainly not a case of cretinism, he calls it rickets. *Measurements of* II. 4. Total height 120 cm. Span 125 cm. Humerus 23 cm. Radius 16 cm. Femur 26 cm. Tibia 22.5 cm. (Bibl. No. 436, p. 46.)

Fig. 752. *Dufour's Case*. I. 1, died of tuberculosis. I. 2, of heart disease and hemiplegia, both were normally formed. Of their five children, the three elder, II. 1-3, and the youngest, II. 5, were normal. II. 4, aged 14½, was born at 8 months. At birth it was noticed that her hands and feet were badly formed. When four years old her small size was noticeable. When seen in 1906 she had a relatively big head, the cranium being very large; the lower limbs were too short. She had very pronounced lumbar curvature and prominent abdomen. Her muscles were on the whole well developed. When the arms were extended by the sides the extremities of the fingers passed slightly beyond the limit which separates the upper third from the middle third of the thigh. She was merry but backward, could read and write but her intelligence was equal to that of a child aged 7. Possibly achondroplasia. *Measurements*. Height 124 cm. Trunk, from episternal notch to symphysis pubis upper border 52 cm. Total length of upper limb 52 cm. Upper arm 20 cm.; forearm 18 cm.; hand 14 cm. Total length of lower limb 62 cm. Thigh 33.5 cm.; leg 28.5 cm. The fourth finger of each hand was almost as short as the fifth. Of the forearm the radius alone was incurved. (Bibl. No. 519, p. 133.)

Fig. 753. *Morse's Case*. I. 1, and I. 2, were Italians who were healthy and of fairly good habits. There was no history of any similar deformities and no miscarriages. Their first child, II. 1, weighed 12 lbs. and was born dead after severe instrumental delivery. II. 2, was born at full term and except for deformities seemed normal. He was brought to the hospital for inguinal hernia. The limbs were very short, especially the legs. The bridge of the nose was depressed. He had slight exophthalmus. No abnormality of the thyroid gland could be made out. The humerus felt 2½ cm. thick at least, the rotation of the radii was normal. The thighs and legs were held in almost the position of a circle. He died of some enteric disease aged 4 months and no autopsy was obtained. Measurements are given, but the description of them is vague in several cases. (Bibl. No. 416, p. 561.)

Fig. 754. *Heiman's Case*. There was no history of dwarfism in this family. The parents, I. 1, and I. 2, were of at least average intelligence and physique. Of their two children, II. 1 was of normal growth. II. 2, was brought to hospital at the age of 6 months for penile hypoplasia. He was well nourished but had an almost imbecile expression; he seemed, however, able to see and hear. The head was about normal in size, the anterior fontanelle patent, the posterior closed. The hair was thin, the ears deformed, the nose short, flat, and *retroussé*, with broad and depressed bridge. The gums were enormously hypertrophied and irregularly thickened; two months later, i.e. at the age of 8 months, teeth began to erupt. The hard palate was high-arched, the soft palate thickened, the neck short and the thyroid gland not palpable. The abdomen was protuberant. The long bones of the extremities were short, curved and thickened. The hands were squat and showed the trident deformity. The fingers were nearly all of the same length. The third toe on each foot was deformed and without a nail. Most of the nails were ill-developed. *Measurements*. Length of body 56 cm. Vertex to umbilicus 30 cm. Umbilicus to sole of foot 26.5 cm. From acromial angle to distal extremity of middle finger 19 cm. Upper arms 8 cm.; forearms 5.5 cm.; hands 5.7 cm.¹ Antero-superior iliac spine to internal malleolus 21 cm. Length of

¹ No points of measurement stated for "arms."

thigh from great trochanter to "knee" 11.5 cm.; from "knee" to internal malleolus 9 cm. Circumference of neck 20 cm.; chest 38.5 cm.; abdomen 40.5 cm. Sub-occipito-bregmatic diameter of skull 12.6 cm.; sub-occipito-frontal ditto 13.6 cm.; occipito-frontal ditto 14 cm.; occipito-mental ditto 14.5 cm.; bi-parietal ditto 11 cm.; bi-malar ditto 9.15 cm.; occipito-frontal circumference of skull 41 cm. (Bibl. No. 487, p. 842.)

Fig. 755. *Chambrelent's Case*. There is very little said about this case. During a discussion on Auché's case, M. Chambrelent stated he knew a young achondroplastic woman, II. 2, whose twin sister, II. 3, was also achondroplastic. The same case is said to be reported in the *Journal de Médecine de Bordeaux*, 1906, Année 36, p. 67, with the addition that a third sister, II. 1, was also achondroplastic. Nothing is said of the parents. (Bibl. No. 517, p. 117.)

Fig. 756. *Dupuytren's Case*. I. 1, and I. 2, were healthy and of average height. They had five children, II. 1—5. Two boys, II. 1—2, born before II. 5, died, II. 1, aged 1½, II. 2, aged 8 months, both of normal size for their years. II. 3—4, were healthy with a development superior to that of most children of their age. II. 5, aged 26 months, when born was only the size of a foetus of 5 months, but his development was that of an ordinary child at birth, there was nothing remarkable about him except the extreme smallness of his body especially the head. He was breast-fed and at the end of a year had only grown a few inches, and his weight had increased just in proportion to the increase in his size. When seen by Dupuytren at the age of 18 months, he had very long hair, and a very small skull with the fontanelles closed. Proportionately to the skull the face was much developed, the neck was thin, the chest and abdomen of moderate size, the lower limbs longer than is usual at this age. He was merry and restless and enjoyed good health. When seen again 8 months later his weight was 6 lbs. 2 oz. (6 livres 2 onces) and height 1' 5" (1 pied 5 pouces). The eyes were very small, the senses well developed, the sense of smell, however, least so. He did not walk or speak any word distinctly. The intellectual faculties were fairly well developed and apparently he could combine ideas as he acted in a way which presupposed reasoning. Perhaps ateleiosis, possibly microcephalic dwarfism. (Bibl. No. 54, p. 146.)

Fig. 757. *von Franqué's Case II*. No statement is made with regard to I. 1, and I. 2. II. 2, aged 28, was a weakly anaemic person of dwarfish stature. Height 44" 8". She said she had learnt to walk in her third year. She suffered from violent pains in the lumbar vertebrae and sacral region. The vertebral column was scoliotic, there was a great curve to the L. in the upper and middle dorsal region and in the lumbar region a lesser deviation to the R., which ended in the sacrum. The conjugata of the pelvis was 3" 3" so premature delivery was brought on. The child was very small, weighed "2 Pfund 13 Loth" and died three days later. The mother recovered. Possibly rickets. (Bibl. No. 141, p. 120.)

Fig. 758. *Michel's Case*. I. 1, was epileptic. I. 2, was healthy and in 12 years had borne six girls, II. 1—6, all of whom were alive but weakly and suffering from slight rachitis and scrofula. Syphilis was out of the question. II. 7, a boy, was stillborn. He had a small body, very short limbs, and a head like a ball covered with long brown hair. The neck was short and swollen, the abdomen prominent, the arms thick and swollen and flexed at the elbows. The metacarpus was thick and the fingers badly formed. The legs, which were in varus position with the soles of the feet turned up from behind, were like sausages, with no sign of a knee. The feet were thick but well formed. *Measurements*. Length of body 37 cm.; trunk 29 cm. Distance of the neck from the umbilicus 14 cm.; navel from the symphysis 3 cm. Circumference of head 29 cm.; chest 21 cm.; pelvis 19 cm. Length of the arms from the axillae 9.5 cm.; distance from the axillae to the elbows 3 cm.; elbows to the wrist 3.5 cm.; wrist to the tips of the fingers 3 cm. Circumference of upper arm 8 cm.; of forearm in upper part 7.3 cm., in lower part 7 cm. Length of the legs from the groin to the tips of the toes 9 cm.; distance from the groin to the ankle 6 cm.; to the knee 4 cm.; knee to the ankle 2 cm. Circumference of the thigh 11.5 cm.; of knee 8 cm.; of leg in the upper part 6.5 cm.; of lower part 5.5 cm. Length of great toe 1.1 cm.; L. humerus 3.7 cm.; L. ulna 3.5 cm., L. radius 2.7 cm.; L. femur 4.5 cm.; L. tibia 3.1 cm.; L. fibula 2.5 cm. The diaphysis of the humerus was much curved the convexity being to the front; it was fractured lengthways and transversely. The femur was bent at an obtuse angle in the middle, the convexity being behind, it was fractured at the bend and abnormally flexible. (Bibl. No. 449, p. 1.)

Fig. 759. *Johannessen's Case*. I. 2, had been a driver three years before, and had then drunk somewhat. He still took a glass now and then but was "nie bei Zechgelegen." He had bronchitis about three years before, and afterwards coughed more or less. Some years later he had inflammation of the lungs and was ill for three weeks at home and for six weeks in hospital. I. 3, had had bronchitis seven years before and was weak and had little strength. One of her sisters, I. 4, aged 11, died of dropsy, another, I. 5, of inflammation of the stomach. A sister of I. 2, namely I. 1, died of a purulent disease of the lungs. Neither I. 2, nor I. 3, ever had syphilis, and no tuberculosis, insanity, convulsions, haemophilia or struma could be ascertained to exist in the family. I. 3, had had to stand a good deal during her last pregnancy nursing her husband, and had twin girls II. 6—7, who got measles at the age of 5 months

and died. She also had to look after her five eldest children, II. 1—5, who were healthy, and she worked as an ironer as well. II. 8, weighed 3000 grammes at birth with wrappings. Her spine was very long, and she had lumbar dorsal kyphosis. She was taken to hospital when one month old. The pelvis was extremely deformed. She had a peculiar appearance and looked rather like a skinned hare. She died and there was an autopsy. *Measurements.* Circumference of head 34 cm.; bi-parietal diameter 10 cm.; fronto-occipital diameter 11 cm. Chest circumference under axillae 26.5 cm.; over nipples 26 cm.; over the costal arch 26.5 cm. Total length of body 52 cm. Height when sitting 37 cm. Span 45 cm. Length of upper arm from acromion: R. 6 cm.; L. 7 cm.; forearm 6 cm.; hand through third finger 8 cm. Distance between the iliac crests 9 cm.; antero-superior iliac spines 8 cm.; postero-superior iliac spines 2.5 cm.; great trochanters 12 cm.; ischial tuberosities 2.5 cm. Length of thigh from end of trochanter to knee-joint R. 8.5 cm., L. 9 cm. Length from knee-joint to end of internal malleolus 8.5 cm., to end of external malleolus 8 cm. Length of foot from heel to second toe 9.5 cm.; neck from the hyoid bone to upper limit of manubrium 2 cm. Circumference of neck 15 cm. Length of humerus about 6.7 cm.; radius 5.3 cm.; ulna 6 cm.; femur 8.7 cm.; tibia, about 8 cm., fibula 7 cm. (Bibl. No. 351, p. 351.)

Fig. 760. *Du Plessis' (James Paris) Case.* I. 1, John Grimes, aged 57, height 3' 8", was born at Newcastle on Tyne, he married I. 2, a normal woman, and had four children, II. 1—4. He was a short and very thick man, "he was as broad as he was long from hand to hand stretched" (meaning obscure). He sold himself to a surgeon some years before his death for 6d. a week—to be dissected after death. Paris gives a water-colour picture of him. He is represented with a stick and a long coat to the knees. His legs look straight, and he does not appear deformed—he has no beard and looks like a boy. Garnier (Bibl. No. 205), however, states that he was deformed and a small Hercules, and Paris that he could between 30 and 40 years easily lift upon his two hands two ordinary men. Paris saw his skeleton after dissection. (Bibl. No. 18^b.)

Fig. 761. *Maygrier's Case.* I. 1, was alive and healthy. I. 2, had been very nervous, subject to convulsive attacks followed by loss of consciousness. She died aged 44 of cerebral haemorrhage. She had 13 children, II. 1—13, of whom four, II. 9—12, were pairs of twins. II. 13, aged 23, primipara came for her confinement, five of her brothers and sisters were alive and healthy, of whom several had healthy children, III. 1. II. 13, had been breast-fed. She was healthy but nervous. She married at age of 21, and for about four months afterwards suffered from bad headaches. Her husband, II. 14, was aged about 35, he was rather delicate and suffered from chronic bronchitis. He had been ten years in the Colonies and had had intermittent fever. He never had syphilis, but drank a good deal, and was of only mediocre intelligence. He could give no particulars of his family, and had the face of a rachitic person. The pregnancy was normal, labour was difficult, instruments were used, and the child died during labour. It was a boy and weighed 2640 grammes, length 38 cm. He had the characteristic appearance of an achondroplastic infant. The trunk was normal, the limbs short, deformed and thick. The skin lay in rolls on the limbs. Head diameters were: occipito-mental 13.5 cm., occipito-frontal 12.3 cm., sub-occipito-bregmatic 9.6 cm.; bi-parietal 10 cm.; bi-temporal 8.2 cm. No other measurements are given. (Bibl. No. 346, p. 249.)

Fig. 762. *Boissard's Case.* II. 2, was member of a family which was healthy and rather above the average in height. She had a younger sister, II. 3, who was tall and healthy. She herself had never been ill, but had not walked till she was 3½ years of age. Her height was 114 cm., but she was fairly well proportioned and her whole skeleton appeared reduced. Her head was large with a bulging forehead. The upper and lower limbs were very short, but only slightly incurved. The vertebral column was normal. No measurements are given. She became pregnant; Caesarian section was performed, and a male child extracted who weighed 2760 grammes, and had both feet in equino-varus position. Mother and child lived. (Bibl. No. 347, p. 33.)

Fig. 763. *Lecadre's Case.* I. 1, was alive, but no statement is made with regard to his health. I. 2, died of cancer of the womb. II. 3, was of frail constitution, she had had a normal child, a strong and healthy boy¹, five years before marriage. She married at age of 36, and had two miscarriages at four months, neither she nor her husband, II. 4, showed any trace of rickets, syphilis or scrofula. She came to be confined in 1858, then aged 38. The confinement was natural, a female stillborn child, III. 4, being born. The child had a very large head, like a hydrocephalic head with the sutures widely separated, she had dark hair 1.5 cm. in length, a bulging forehead, flat nose, thorax depressed laterally and an enlarged abdomen. The genital organs were normal. The upper arms were represented by two thick and short appendages, 9 cm. in circumference at the middle, the forearms were equally deformed and rudimentary and were flexed on the upper arms. The hands were normal. The lower limbs were also thick and short. The thighs were very short, the legs being represented by two small fleshy stumps, the whole forming an irregular arc with the concavity turned inwards and backwards. The knees were far apart, the soles of the feet turned in, the skin in general thick. The humerus was thick and short, with enlarged epiphyses, it was concave in front and convex behind and was

¹ Erroneously marked on pedigree as offspring of a first marriage.

covered like all the bones with a reddish periosteum. The radius was shaped like an S, it and the ulna formed an obtuse angle with the humerus. The fibula was curved similarly to the radius and was about the same length. The hand was bent at a right angle on the ulnar side. The femur was shaped like an hour-glass. Relatively to the coxal bone and the leg, it was directed horizontally outwards and forwards from the cotyloid cavity. The tibia and fibula were also shaped like a double cone or hour-glass, but the curves were less pronounced. *Measurements.* Length from the sinciput to the calcaneum 33 cm. Bi-acromial diameter 9 cm. Bi-iliac diameter 8 cm. Occipito-frontal circumference 33 cm. Mento-bregmatic circumference 33 cm. Sub-occipito-bregmatic circumference 31 cm. Circumference of abdomen at umbilicus 27 cm. Distance of the umbilicus from the pubis 5 cm.; from the xiphoid process 6 cm. Length of the humerus 2.7 cm.; radius 2 cm.; femur 3 cm.; diaphysis of the femur 2 cm. Breadth of the femur at middle point 0.5 cm.; at the extremities 1.4 cm. Length of foot 4.5 cm. Breadth of foot 2.5 cm. (Bibl. No. 108, p. 8.)

Fig. 764. *Townsend's Case.* No statement is made with regard to I. 1 and I. 2. II. 2, aged 32, height 3' 9", and with legs and arms much deformed by rickets, came to the hospital for her confinement. She had convulsions during delivery, the cephalotribe was used and the child extracted. The mother died, and there was an autopsy. The antero-posterior diameter of the pelvis only measured $1\frac{9}{16}$ " across, the transverse diameter was $3\frac{1}{2}$ ". A large fibrinous polypus occupied almost the whole of the R. auricle, being attached to the heart near the tricuspid valve. (Bibl. No. 166, p. 90¹.)

Fig. 765. *Quatrefages' Case.* "Prince Balthazar or Balthazar Zimmermann." I. 1, and I. 2, were robust and well formed. They had nine children, II. 1-9, eight of whom were normal. II. 9, the dwarf, was born at Glaris in Switzerland. The man who was exhibiting him said he had been of normal proportions at birth, but his growth ceased later, he also said he was aged 16, measured 76 cm. and weighed 9 kilos. Quatrefages was unable to measure or weigh him, but judged from seeing him that the measurements were not far wrong. There appeared to be nothing deformed in his body, the shoulders were broad, the torso rather thick set and the chest well developed. The abdomen was rather over developed. The limbs appeared to be in harmony with the trunk, the hands were plump (*potelées*), the head much too large for the body, its height being rather more than a fifth of the total height. The forehead was high and arched, the parietal bosses being very pronounced. He had not much hair. The cheeks were large and fleshy, the eyes relatively large and the mouth small. The nose was too little developed being depressed and narrow at the bridge. He did not look like a child. He could read and write German well and knew some Italian. He could sing songs, his voice was thin and rather cracked, but true. Towards his family he was very affectionate. Regnault has classified the case as achondroplastic, but pictures (see our Plate JJ (71")) do not wholly confirm this view. (Bibl. No. 187, p. 703.)

Fig. 766. *Stilling's Case.* No statement is made with regard to I. 1 and I. 2. II. 5, was the fifth child of II. 2, the four others, II. 1-4, were normal. II. 5, was stillborn, born without help but so precipitately that the head and neck received injuries. There was dark hair on the head, the skin was pale and very oedematous, forming thick rolls on the limbs, which became circular ridges at the joints. The extremities were remarkably short in proportion to the body, and the abdomen large relative to the extremities. The face was quite normal, as were also the external genital organs. The most remarkable abnormality was the roof of the skull which was almost wholly membranous. When the brain was taken out the soft parts fell together and formed a thick wrinkled membrane which covered the base of the skull. There was slight scoliosis in the upper part of the dorsal spine with convexity to the right, otherwise the spine was normal. The thorax was in general normal and the pelvis was normal. The L. humerus was short and thick with the cartilaginous epiphyses well developed, the radius and ulna were much curved, the curvature being outwards. The R. upper extremity was like the L., except for a fresh fracture in the lower third of the humerus. A fracture was noticeable in the upper third of the L. thigh. The tibia was bent in below the middle, the bend being like an obtuse angle with the opening behind. The fibula was much bent, the R. thigh was broken in the middle. The cartilaginous epiphyses of both femora were large in proportion to the diaphyses, but yet were normal. The diaphysis of the R. fibula was detached from the upper epiphysis, the bone itself showed a worse bend than the L. and the curvature of the R. fibula was greater than the L. *Measurements.* Total length 35 cm. Length of R. arm 7 cm. Length of hand 3.5 cm.; index finger 1.6 cm.; middle finger 1.8 cm. Transverse circumference of hand 3.5 cm. Length of R. lower extremity 8 cm.; foot 4.5 cm.; second toe 1 cm. Transverse circumference of foot 4 cm. Total length of tibia 3 cm. Upper epiphysis of tibia 0.8 cm. Lower epiphysis of tibia 0.6 cm. (Bibl. No. 245, p. 357.)

Fig. 767. *Schieb's Case.* I. 2, looked rather imbecile, she had five children, the first, II. 1, by a different father, suffered immediately after birth from "Augenfluss" ("ein Auge soll ausgelaufen sein"). I. 2, had heartburn (Brennen) then, with incontinence of urine (Wasserlassen) and falling of the vagina.

¹ The reference to this pedigree in Bibl. No. 293 is an error.

Four months after the birth of the first child, she had a miscarriage, II. 2. The account does not state whether the miscarriage was due to pregnancy by I. 1 also. The other children, II. 3—6, by II. 3, came into the world in six years, the children were healthy, had no deformity and learnt to walk soon. At three years of age all had suffered from skin ulcers which soon disappeared. II. 3, the father, was alcoholic and suffered from chest affection. No goitre or deformity was known in the family. II. 7, was being exhibited by his parents in the annual market as a "Maulwurfensch" and was taken to the hospital. He had been born after a normal pregnancy, and the doctor who had attended gave details. The birth was normal, but the small size, curved limbs, extraordinary growth of hair and almost coal black colour of the skin were remarkable. The mother could not nurse him, not having milk enough. He was extraordinarily small and thin, with dark brown skin over the whole body, nearly black on the forehead and cheeks. There was long black hair on the head, black lanugo over the whole body, especially on the forehead and on the exterior-surfaces of the limbs and back. The head was very large relative to the body and the fontanelles were wide open. The extremities were curved and thickened at the angles. The greatest curvature in the lower extremities was in the middle of the thigh. The testicles and epididymis were greatly developed. The child died in about two months. *Measurements.* Length from vertex to umbilicus 28 cm.; vertex to buttocks 34 cm.; heel to umbilicus 9 cm.; heel to buttocks 8 cm.; the xiphoid process to navel 5 cm. Circumference of chest at the nipples 26.5 cm.; at lower aperture 25 cm. Maximum abdominal circumference 24 cm. Abdominal circumference at umbilicus 22 cm.; at the height of the antero-superior iliac spine 22 cm. Distance from the symphysis pubis to the umbilicus 3 cm. Length of humerus from the great tuberosity to the external condyle 6.5 cm.; radius from the capitellum to the styloid process 6.1 cm.; ulna from the olecranon to the styloid process 6.5 cm.; the hand from the styloid process of the radius to the end of the third phalanx of the index finger 6.2 cm.; femur from tip of great trochanter to the external condyle 8.4 cm.; tibia from the internal condyle to the internal malleolus 6.3 cm.; fibula from the capitulum to the external malleolus 5.8 cm.; foot from the posterior calcaneal process to end of first toe 6.5 cm.; left clavicle 4.1 cm.; right clavicle 3.5 cm. Head: Fronto-occipital diameter (from the glabella to the furthest projecting point of the occiput) 10 cm.; bi-parietal larger transverse diameter 11.5 cm.; mento-occipital largest oblique diameter (from chin to most distant point of the skull on the lower edge of the small fontanelle) 12 cm.; sub-occipito-bregmatic, smaller oblique diameter (from the limit between the occiput and neck to the middle of the large fontanelle) 10 cm.; vertical diameter (from vertex to base of skull) 8 cm. Further measurements of hand, pelvis and foot as well as particulars of the microscopical examination are given. (Bibl. No. 367^b, p. 93.)

Fig. 768. *Temple's Case.* I. 1, a dwarf, aged 45, height somewhat under 3', was seen by Temple in the retinue of the Bey of Tunis at a place called Tozer. He was called Aboo Zadek and had a family, II. 1—6, consisting of four boys and two girls. He had been married four times, and his fourth wife was said to be extremely pretty. (Bibl. No. 77, p. 180.)

Fig. 769. *Bode's Case.* No statement is made with regard to I. 1. I. 2, was healthy till she had chicken-pox in childhood. She was fairly strongly built and showed no signs of rickets or any disease, except a moderate degree of struma. She had twins, II. 1—2, at her first confinement, no statement is made regarding them. At her second confinement there was born a boy, stillborn, II. 3, who weighed 3100 grammes. The middle of the length of the body was about at the base of the xiphoid process, the head was hydrocephalic, the nose flat and depressed at the root, the skin of the trunk swollen and in some places in folds, the chest depressed and short, the abdomen prominent. The extremities were much too short in proportion to the trunk. In a vertical position the upper arms did not reach the iliac crests. The diaphyses were ossified and shorter and thicker than in normal cases, the epiphyses enlarged. The diaphyses were curved, the humerus was concave towards the front and inwards, the ulna concave towards the front, the radius concave outwards and towards the front. In the femur, the head and great trochanter were to outward appearance fully ossified; "die Epiphysenenden nach hinten stark umgewölzt, so dass eine stark vorn convexe Krümmung zu Stande kommt, welche am rechten Femur zugleich stärker als links nach aussen gerichtet ist, so dass die Patella mehr auf der äusseren Seite aufsitzt." The hand was greatly developed in proportion to the arm. The thorax was shortened from above downwards and the lower aperture enlarged towards the sides. Full measurements are given both of body and skeleton but some appear to be rather vaguely defined. (See Bibl. No. 203, p. 421.)

Fig. 770. *Mansfeld's Case.* No statement is made with regard to I. 1 and I. 2, except that I. 1 was a ladies' tailor and II. 1 was his illegitimate son. II. 1, was a soldier for a long time; in 1815 he squandered his little property in drink, became a complete drunkard and in 1816 married II. 2, a woman several years older than himself. They had five children, III. 1—5. III. 1, died of a scrofulous affection of the abdomen. III. 2—3, with the exception of scrofulous eruptions and inflammation of the eyes, were fairly healthy and well grown. Three years before the birth of III. 5, II. 1 had inflammation of the lungs and vomiting of blood, and for a still longer time he had suffered from cough and contraction of the chest. II. 2, during her pregnancy with III. 5, had suffered from gouty and hysterical affections. Both parents were over 40 years of age at time of birth and were

in the direst poverty. The confinement was normal. The child II. 5, a girl, showed no deformity except that her feet were drawn up to the body. The L. foot was turned towards the genital organs and covered them, both knees were turned out and it was impossible to extend the legs. The head was round like a ball and covered with long black hair; its size, not over large, was proportionate to the size of the rest of the body. All the ribs looked as if they had been fractured *at least* once and grown together again. The upper arms showed apparent fracture in the middle and grown together again. The ulnae and radii of both arms were much thicker than normal and were so close together that there was no recognisable interstitial space. They also showed signs of healed fractures as did the femora and tibiae. *Measurements.* From the vertex to the tips of the toes 1' 1" 3"; to the end of the sacrum 9" 8½". Length of spine to the end of the sacrum 6" 9"; dorsal spine 2" 8"; sternum with the xiphoid process 2" 2"; the xiphoid process 6"; head from posterior end of sagittal suture to chin 3" 3½". Maximum height of head in region of vertex 2" 11"; breadth of head close under both parietal protuberances 2" 11". Length of R. humerus without cartilaginous extremities 1" 3"; L. humerus without cartilaginous extremities 1" 4½"; R. ulna 1" 5½"; L. ulna 1" 6½"; R. radius 1" 2½"; L. radius 1" 3½"; middle metacarpal bone 4½"; middle finger of each hand 10"; R. thigh 1" 4½"; L. thigh 1" 5½". Maximum thickness of thigh at upper end 7"; in middle 6". Length of R. tibia 1" 1"; L. tibia 1" 1"; each foot from the heel to the second toe 1" 5", etc. (Bibl. No. 76, p. 552.)

Fig. 771. *Dyes's Case.* Of I. 1 and I. 2 nothing could be ascertained. II. 3, was a twin brother of II. 2, and it is stated that he, II. 4 and II. 5 were all remarkably small, not much taller than II. 2. II. 2, primipara, aged 40, was unmarried. She had been well taken care of by her foster-parents and as a child had never been ill. She came to the hospital for her confinement. She was well nourished, her muscles were well developed but flabby. All parts of the body appeared retarded in growth, especially the upper extremities. The root of the nose was sunken; the tubera parietalia were projecting. Her expression was not that of a cretin. The teeth were regular and showed no abnormality. The spine was straight, the epiphyses of the long bones were not thickened and the diaphyses were straight but noticeably short. Her gait was slightly waddling; she gave good answers to questions. The head was rather too large for the trunk. On account of the small pelvis, it was decided to bring on a premature confinement in the 32rd week of pregnancy. A female child, III. 1, was born without any deformity. Weight 4¼ "Pfund." Length 45.5 cm. The head measurements were: Horizontal diameter 102 mm.; greater transverse diameter 80 mm.; lesser transverse diameter 70 mm.; greater oblique diameter 115 mm.; lesser oblique 80 mm.; circumference 30 cm. It is not stated whether the child lived or not, apparently the mother survived. *Measurements of mother.* Total height 120 cm. Head measurements: Diameter between glabella and external occipital protuberance 16 cm., anterior transverse diameter between the alae magnae 11 cm.; posterior transverse diameter between the tubera parietalia 13.5 cm.; height of head from foramen magnum to vertex = external auditory meatus to vertex 13.5 cm.; vertical distance of chin from vertex 19.2 cm.; distance from the root of the nose to vertex 12.5 cm.; circumference over glabella and external occipital protuberance 48 cm.; circumference (through ends of greater oblique diameter) 55.5 cm.; transverse arc (Topinard), i.e. from one cavity under the auditory meatus to the other 35 cm. Length of trunk - vertical distance of the cavity under the external auditory meatus to the horizontal line of the symphysis pubis 53.5 cm. Suprasternal notch to the xiphoid process 16 cm. Sagittal diameter of the thorax, at the height of the suprasternal notch 11.5 cm.; at the middle of the sternum 15 cm.; at the level of the xiphoid process 17 cm. Circumference (tape measurement): at the level of the manubrium 73 cm.; at the level of the middle of the sternum 75.2 cm.; at the level of the xiphoid process 69 cm. Breadth of chest at axillae 26.5 cm. Upper limb: from acromion to tip of middle finger 52 cm.; from acromion to lateral condyle on the lower end of the humerus 21.5 cm., from the lateral condyle to the styloid process of the ulna 17.5 cm., length of hand from semilunar bone to tip of middle finger 13 cm.; distance from the tip of the middle finger to the sole 48.5 cm.; distance from acromion to acromion 26.5 cm. Lower limb: from upper edge of symphysis pubis to the sole 57 cm.; from the tip of the great trochanter to the tibio-femoral articulation 28 cm.; from the external malleolus to the tibio-femoral articulation 26.2 cm.; length of foot 19.5 cm.; distance from the knee joint to the sole 31 cm.; "cavity of Baudeloque" (flocus) to the sole 60.5 cm.; lower edge of symphysis pubis to the sole 53 cm. (Bibl. No. 225, p. 14.)

Fig. 772. *Kehrer's Case.* 1. 1, died of tuberculosis. 1. 2, was healthy. II. 2, aged 19, was pale, but appeared to be healthy. Nothing is said about II. 3. III. 1, was born in the 8th month and died at birth. Its head was large, the ribs bent in on both sides, the abdomen large, and the extremities relatively short, with short, curved, thick diaphyses and enlarged epiphyses. It was the first child. No measurements of the skeleton are given. (Bibl. No. 145, p. 61.)

Fig. 773. *Kaufmann's Case.* No statement is made with regard to I. 1 and I. 2, but II. 1, aged 20, and II. 2, aged 16, were brother and sister. Neither of them ever had syphilis, but II. 2 was weakly. A premature confinement was brought on and description of the infant, III. 1, a female, is given. The expression was senile, the nose flattened and rather depressed at the bridge, the

upper lip and eyelids very thick, and the soft parts of the pelvic region greatly developed. One could not distinguish where the forearms ended and upper arms began, and there was a circular groove at the wrists. The hands were flexed at an acute angle on the forearms. In the lower limbs the heels touched the inner surface of the thighs, the outer edge of the foot was turned very much out and the soles were very concave. The spinal column was very flexible; the clavicles were hard and ossified throughout but slender. The scapulae were short and thick and measured 2.2 cm. at the inner edge. The humeri were bent at an angle inwards and their upper epiphyses were disproportionately thick. The short thighs were bent at an angle on the inner side and the bones of the lower part of the leg were much shortened and bent at an acute angle. The feet were in equino-varus position, the end of the calcaneum being about 1.2 cm. from the external condyle of the femur. *Measurements.* Skull: circumference 23 cm.; smaller transverse diameter 6.4 cm.; greater transverse diameter 7 cm.; longitudinal diameter 8.2 cm.; perpendicular diameter 5.5 cm.; smaller oblique diameter 7.5 cm.; greater oblique diameter 8 cm.; length of large fontanelle 3.2 cm.; breadth of large fontanelle 2.2 cm. Length of body 24 cm. Distance of vertex from umbilicus 17 cm.; from sole to umbilicus 7 cm.; xiphoid process to umbilicus 5 cm. Circumference of chest at nipples 20 cm.; at axillae 18 cm.; at abdominal ring 21 cm. Maximum abdominal circumference 18 cm. Circumference at umbilicus 17 cm.; of pelvis at antero-superior iliac spines 13 cm. Distance from the symphysis pubis to umbilicus 3.5 cm. Length of arm 6.5 cm.; hand 3 cm.; index finger 1.2 cm.; hand without fingers 1.1 cm. Circumference of hand 5 cm. Length of lower limb 8 cm.; foot 4 cm. Circumference of calf 6.5 cm. Maximum thickness of thigh 11 cm. Width of neck 12 cm. Length of clavicle 2.6 cm.; femur 4 cm.; diaphysis of femur 2.5 cm.; transverse diameter of diaphysis of femur 0.5 cm.; upper epiphysis of femur 1.9 cm.; lower epiphysis of femur 2.1 cm. Length of tibia 2.2 cm.; diaphysis of tibia 1.8 cm.; fibula 1.5 cm.; humerus 3.8 cm.; radius 2 cm.; ulna 2 cm. (Bibl. No. 275, pp. 16 and 25.)

Fig. 774. *Reyher's Case I.* I. 2, and I. 3, were siblings. This is the only thing of note in the family history. II. 2, and II. 3, had nine children, of whom seven were alive. The account states further that II. 2 had miscarried four times, twice, III. 1—2, before the first child, once, III. 6, before the fourth child, and once, III. 12, before the ninth child'. Of the children that died, III. 3 died aged 14 months of inflammation of the chest and lungs, the other, the fourth child, III. 7, died aged 4 days; this child had a similar appearance to that of III. 13. The doctor who was present said it measured 40 cm., the limbs were extremely short and deformed, the head large relative to the body, the nose flat and depressed and it also had cleft palate. Five of the surviving children, III. 5 and III. 8—11, were healthy and well grown. III. 4, aged 14, was retarded in growth but showed no sign of chondrodystrophia foetalis, being well proportioned. The mother said she had carried the achondroplastic children longer than the others. III. 13, was brought to hospital at the age of 4 months; the mother said that from birth she had a large head, short neck, protuberant abdomen and too short limbs, and had suffered from shortness of breath. The trunk was normal, the head appeared too large, the limbs were too short. With hanging arms, the finger tips scarcely reached to the trochanters, the hands were short, square and trident shaped. The neck was very short, the tongue appeared rather large, the skin lay in folds on the lower limbs. The hair was dry; she had slight umbilical hernia and genu valgum on both sides. The knee-joints exhibited a considerable amount of super extensibility. In the elbow joints perfect extension was impossible. *Measurements.* Total length at age of 4 months 51 cm. Length from vertex to umbilicus at age of 4 months 26 cm. Distance from umbilicus to sole of feet, at age of 4 months, not quite 25 cm. Total length of body at age of 8½ months 56.5 cm. Length of trunk at age of 8½ months 33 cm.; lower part of body at age of 8½ months 23.5. Circumference of head at age of 8½ months 42 cm. Weight at age of 8½ months 5660 grammes. (Bibl. No. 545, p. 130.)

Fig. 775. *Volkov's Case I.* Very little is said of this case. I. 1, and I. 2, were normal. Their son, II. 2, aged 24, a peasant of Tartar origin, in the district of Tetiushi, in the province of Kazan, was 90 cm. in height, very well made and fairly robust. (Bibl. No. 324, p. 288.)

Fig. 776. *Reyher's Case II.* I. 1, and I. 2, were healthy. No case of dwarf growth or deformity was known in their families. Of their children, II. 1, aged 16, was perfectly healthy. II. 2 and II. 4, were stillborn, the result of strangulation by the umbilical cord, but they were well formed. II. 3, died aged 1½ years of diphtheria. After birth of II. 5 there were two miscarriages, II. 6—7. II. 5, aged 3½ years, weighed 9½ "Pfund" at birth. It was noticed then her head was too large and limbs too short. The birth was normal, she was breast-fed for three weeks and began to walk at the end of the second year. Her head was abnormally large with projecting tubera frontalia and parietalia on one side. The large fontanelle was not closed. The limbs were short, the fingers scarcely reached to the trochanters. She had lumbar lordosis. In peculiarities of skin, knee and elbow joints and genu valgum this case resembled Reyher's Case I. The humerus and femur were very short. A radiographic plate of the forearm is given. She weighed 23½ "Pfund." *Measurements.* Circumference of head 53.5 cm. Length of body 78.5 cm.; part above umbilicus 40.5 cm.; part below umbilicus 38 cm.; radius 7.9 cm.; ulna 8.9 cm.;

¹ Owing to a misreading III. 12 on the plate is marked as four miscarriages instead of as the fourth miscarriage.

metacarpus I. 1.6 cm.; metacarpus II. 2.3 cm.; metacarpus III. 2.3 cm.; metacarpus IV. 1.9 cm.; metacarpus V. 1.9 cm. (Bibl. No. 542, p. 134.)

Fig. 777. *Schwenderer's Case*. Of I. 1 no statement is made. I. 2, was never rachitic but in youth she had suffered from goitre, which had disappeared for a time under treatment, but later reappeared. Her sister, I. 3, was a deaf mute. She had eight children and a miscarriage, II. 1—9. One child, a boy, II. 1, aged 13, was rather retarded in intellect but did not suffer from goitre or rachitis. II. 2, was a miscarriage. II. 3, died young of inflammation of the lungs. II. 4—8, had neither goitre nor rachitis. II. 9, the eighth child, came into the world alive but died soon after. The extremely large head made extraction difficult. The nose was flattened, the neck short and thick, the abdomen large, the scrotum large and oedematous, reaching to the soles of the feet. The extremities were short. The whole arm was curved so that there was posterior and external convexity. No articulation was visible between the upper arm and the forearm or between the thigh and the leg. The feet were in decided equino-varus position, so that the soles of the feet touched the scrotum. The spine was flexible and not deformed. The muscles well developed. *Measurements*. Total length 35 cm. Circumference of head 37.8 cm., of skull 35.5 cm. Bi-temporal diameter of head 9 cm.; of skull 8 cm. Bi-parietal diameter of head 11 cm.; of skull 10.3 cm. Abdominal circumference at umbilicus 33.5 cm. Distance from vertex to umbilicus 25 cm.; umbilicus to sole of feet 10 cm. Circumference of hips at antero-superior iliac spine 31 cm. Length of upper limb 10 cm.; hand 4.7 cm.; extended middle finger 2.7 cm. Circumference of upper arm 12 cm. Length of lower limb 6.5 cm.; of foot 5.5 cm. Maximum circumference of thigh 14.5 cm. Circumference of calf 11.7 cm. Length of humerus 4.7 cm.; radius 2.9 cm.; ulna from tip of olecranon 3.6 cm. Length of diaphysis of femur 4.7 cm.; upper epiphysis 1.3 cm.; lower epiphysis 1.2 cm.; tibia 3.8 cm.; fibula 3.4 cm. A picture of the child is given and an account of the microscopical examination. (Bibl. No. 357, p. 14.)

Fig. 778. *West and Piper's Case*. I. 1, aged 40, was tall and slender. I. 2, aged 25, was slightly below medium height. Their parents were alive and well. They had three children. II. 1, died of pneumonia at 6 months as far as could be ascertained. She was healthy. II. 2, aged $3\frac{1}{2}$, was alive and healthy. II. 3, aged 14 months, was born normally. Two things were noticed at birth, the large round head and the shortness and thickness of the fingers. She was breast-fed but very cross and cut her teeth at the eighth month. When 5 months old slight angular curvature of the spine was noticed. The intelligence was normal. The head was very large with a full growth of soft hair, the anterior fontanelle was open, and the frontal and parietal eminences prominent. The bridge of the nose was depressed and the end turned up. She had slight exophthalmus. The neck was very short and the hands trident shaped. *Measurements*. Weight $13\frac{3}{4}$ lbs. Length $24\frac{1}{2}$ ". Circumference of neck 8"; chest at nipples 14"; abdomen at umbilicus 15"; pelvis at crests $12\frac{1}{2}$ "; head $19\frac{3}{4}$ "; head from ear to ear $11\frac{1}{4}$ "; head from glabella to occiput 14". Head diameters: bi-temporal $4\frac{1}{2}$ "; bi-parietal $5\frac{1}{4}$ "; antero-posterior $6\frac{1}{2}$ "; glabella to occiput 6". Length from the vertex to the antero-superior spinous process $15\frac{1}{2}$ "; antero-superior spinous process to the sole 9". Distance from sternum to pubis $10\frac{1}{2}$ "; sternum to umbilicus 8"; umbilicus to pubis $2\frac{1}{2}$ "; trochanter to condyle of femur $3\frac{3}{4}$ ". Length of fibula $3\frac{1}{4}$ "; tibia 3"; foot (instep $4\frac{1}{2}$ " to $4\frac{3}{4}$ ") $3\frac{1}{2}$ ". Distance from acromion to wrist $6\frac{1}{2}$ ". Length of humerus 3"; ulna 3"; hand and wrist $1\frac{1}{4}$ ". (Bibl. No. 453, p. 730.)

Fig. 779. *Thomson's Case*. I. 1, and I. 2, were healthy respectable people. They had 10 children, II. 1—10, four of whom, II. 1—4, died of acute illnesses. One of these, II. 4, the fourth in order, was said never to have grown properly and to have been always dull. The tenth child, II. 10, was a well-marked sporadic cretin. The others, with the exception of the eighth child, II. 8, were all well grown and normal. Neither I. 1 nor I. 2 knew of any idiots or dwarfs among their relatives. II. 8, aged 4 years and 8 months, had at birth been considered a big baby and was very fat. She was breast-fed for 11 months and at first seemed to thrive well, but when 6 months old the mother noticed she was not as large as she should be, though in other respects she seemed normal and was bright and lively. She began to get her teeth at 7 months old and cut them rapidly and easily. When 9 months old she had her first "turn" or "fit," she became unconscious and the face assumed a bluish tint. Three or four months after she had a similar seizure, and after this they recurred at irregular intervals about once a month. Her mental development proceeded normally and her mother thought she was quite as intelligent as other children of her age. When about $3\frac{1}{2}$ years old she measured 27". She was brought to the hospital on February 26th, 1897, and then looked like a child of 18 months old. Her height was $28\frac{1}{2}$ " and weight 20 lbs. 7 ozs. The circumference of the cranium was $18\frac{1}{4}$ ", that of the thorax 18", and that of the abdomen 20". The body was well nourished and fairly normal in proportions, the skin soft and natural, the hair light brown and fine, but rather dry and scanty, the forehead prominent and the bridge of the nose depressed. The abdomen, heart and lungs were normal and the hands and feet small and neatly formed. The limbs were firm and fairly muscular, and she was active and quick in her movements. Her intelligence seemed quite good, the memory particularly so. She was given thyrocol treatment and on January 12th, 1898, measured $30\frac{1}{2}$ " and weighed 21 lbs. 4 ozs. In March she got one of her old seizures. On April 6th she seemed quite well, but on April 17th became peevish and irritable and died

April 19th. The post mortem showed no abnormality but great congestion of the brain and the persistence of a greatly enlarged but otherwise healthy thymus gland. Thomson thinks the above was a case of ateleiosis, but Gilford thinks it a doubtful case. (Bibl. No. 366, p. 209.)

Fig. 780 *Carus' Case*. I. 1, an extremely small woman whose growth had been retarded by rachitis, gave birth to a stillborn child, who had all the signs of this disease. It had deformed ribs, the extremities of the bones of the limbs were greatly enlarged, and there was deviation of the spine. (Bibl. No. 66, p. 741.)

PLATE LVII. Fig. 781. *Ekman's Case*. In the region of the iron mines in Dannemora a certain family was noticed, which for three generations produced small offspring whose distorted bones had a peculiar softness or fragility. As each male of these big-headed persons arrived at puberty, he married a healthy woman and had children. The bones of the limbs of these children were so frequently fractured, often without any noticeable shock, that when they reached a certain age they were more or less deprived of all strength and power of movement. The ancestor of this race, who died at the end of the century, was Nikolaus Ekroth, I. 1, born of parents who worked in the mines. From ecclesiastical annals and other trustworthy traditions it is certain that he was a little distorted man, quite unable to walk. The old inhabitants of Dannemora, who remembered his miserable condition well, stated they could see no cause for his deformities in his method of life. He married a domestic servant, I. 2, and had four children, II. 1—4. II. 1, born 1702, had in childhood no deformity, but when he became adult he lost power in both arms and legs, was unable to do any work and compelled to live by begging. He died 1775. II. 2, was born 1703. Nothing certain is known of her childhood, but in adult life she was of low stature with distorted body. Her gait was not unlike that of a goose and her feet were turned in. Of II. 3 nothing is known, she may have died in childhood or else migrated. II. 4, was well known among the people as a little man whose stature was very much less than that of other men and who was altogether deprived of the power of walking and compelled to sit. The form of his body was extraordinary with its curved and contorted arms and legs. He married a healthy wife, II. 5, and had a son, III. 1, born 1726. From III. 1's earliest years his legs and arms would break if the slightest force was applied, so that he became distorted like his father and grandfather and was compelled to remain seated. He could only move himself by supporting himself with his right arm and dragging the legs behind. He supported himself by begging and sometimes earned money by making nets. He died aged 56. He married III. 2, a tall strong woman and had two children, IV. 1—2. IV. 1, was born 1760. When aged 1 month the bones of his arms and legs were so soft that at the least contact they became curved and contorted. While less than a year old his bones were fractured three or four times, so that in early years he could only go on all fours unless supported by crutches. As he advanced in age his weak legs could not support the weight of his body, though light. He supported himself by making nets and begging. In 1782 it was said he fractured his tibia by a slight fall, but that it healed in a week. He sustained so many fractures in legs and arms that they became curved and contorted, but neither the joints nor epiphyses were injured. The vertebral column was erect, the head of natural size, the voice sonorous and the body so thin that the bones of the legs and arms could be easily distinguished. His mother said he had been healthy in childhood and no thinner than other children. He did not marry, but might have done so had he not fallen into a lake when drunk and been drowned. IV. 2, aged 23, was born 1765. Her mother said that eight days after birth her arms were fractured without any shock and that, like her brother, IV. 1, her arms and legs were frequently fractured by the slightest accident; even the femora, were often broken and healed again. Her bones became so curved and contorted that when sitting not only her legs but the femora were crossed underneath her. At the age of 14 she was attacked by some disease of which no description could be obtained, which lasted several weeks, and resulted in spinal curvature so that she could no longer keep her body erect. Her joints were flexible and free. The L. humerus was fractured three times in different places and was consequently shorter than the R. and twisted into a shape resembling an S. On account of the lower fracture she could not extend it properly, nor could she extend the fore-arm well as it was broken near the olecranon. The L. femur had been fractured three times in the same place. She was very thin, her head and pelvis were normal, her voice harsh but not unpleasant. III. 2, the mother, said that neither her husband nor his ancestors had ever suffered from syphilis. Their dwelling was not in a marshy place and their food was similar to that of hundreds of men who had robust and strong offspring. The case appears to be one of *congenital fragilitas ossium*; but perhaps rickets should be taken into consideration, although there is nothing definitely pointing to rickets. Other cases of familial *fragilitas ossium* are known; the dwarfism would be only a secondary feature. (Bibl. No. 44, p. 5.)

Fig. 782. *Bayon's Case II*. Nothing is said of Gen. I. II. 5, was twice married, and three times had a miscarriage in the third month. By her first husband, II. 4, she had five children, three sons and two daughters, III. 1—5, all quite normal, but one of the sons, III. 1, died of tuberculosis aged 16. By her second husband, II. 6, she had four children, III. 6—9. Of these, III. 6 died aged 6 months of diphtheria, and III. 7 died aged 2 years of scarlet fever. III. 9, Elizabeth Baunach, born 1883, walked at age of 1½ years and as a small child was alert and cheerful. At age of 5 she had inflammation

of the chest three times, and the third time she had also measles and ulcerative stomatitis. Since that time her mother noticed that she ceased to grow, her memory failed, the joints of her hands, knees and feet became thicker and she walked worse. She was sent to school at 6 years of age, but was sent back as being mentally and physically too weak. She could not learn her letters. At age of 10 she was sent to an Idiot Asylum. Here she apparently made fair progress, but was dismissed in a year as being good-for-nothing. She was in hospital from November, 1897, to May, 1899. Her skull was normal. Her weight 19 kilos. No sign of a thyroid gland could then be felt. The R. leg was in extreme genu valgum position. All the epiphyses were much enlarged (aufgetrieben). The back was rather hairy. Her hair was noticeable because it was like coarse bristles. There was nothing abnormal in her teeth except that an upper incisor was double. In both eyes there were spots on the cornea, and the L. eye showed traces of old iritis. Her speech was harsh, nasal and very quick. There was no deformity of the genitals, but no sign of puberty till, at the age of 19, her breasts began to develop. About 1½ years later, in 1903, there appeared the first signs of pubic hair. The hair of her head had grown and the breasts were larger. The colour of the skin was normal, and the skin was not dry. There was no trace of myxoedema. The thyroid gland could be felt with difficulty in 1903. Bayon says he is unable to

	Height	Weight
<i>Measurements:</i>		
1897	92 cm.	19 kilos
1898	96 "	20 "
1899	98 "	22 "
1900 beginning	106 "	23 "
1901 middle	107 "	24 "
1902 beginning	108 "	25 "
1903 beginning	108 "	26 "

classify this case. II. 2, a cousin of II. 5, the mother, drowned himself and was declared insane. III. 10, child of II. 7, sister of II. 6, did not learn well at school. Possibly this is a case of cretinism. (Bibl. No. 436, p. 50.)

Fig. 783. *Dubois' Case.* I. 1, was a dwarf, 3½' in height. I. 2, was of ordinary stature. They had six children, II. 1—6. Three were normal, III. 1—3, and three were dwarfs, III. 4—6. Only a description of III. 6 is given. She was very small at birth and was exhibited under the name of "The Lilliputian." At the age of 23 she was 3' 2½" in height (French inches). She became pregnant in 1838; the confinement was most difficult. She had violent attacks of eclampsia and Dubois was called in. The forceps were used in vain, and he had to perform craniotomy before he could deliver the child, and even then rupture of the perinaeum occurred. This child, III. 1, weighed 5 lbs. (5 livres). Having become pregnant a second time she came to Dubois, who concluded that the child was very small and therefore waited till the 8th month. He then induced a premature labour, which passed off well. The child weighed 3 lbs. (3 livres). It is not stated whether the child lived, and no measurements or other data are given. Probably true dwarfism? (Bibl. No. 82, p. 513.)

Fig. 784. *Railton's Case.* I. 1, I. 2, and I. 4, were temperate. I. 3, was alcoholic. II. 2, and II. 3, were sober and healthy, not related, and from different parts of England. There was no general causes of ill health and no goitre in the family. II. 2, and II. 3, had seven children, III. 1—7. Of these, III. 2—3, and III. 5—7, showed no trace of cretinism or goitre. III. 1, aged 11, was 32½" high and weighed 34 lbs. He was the first child, born naturally and breast fed. He cut his first teeth at 8 months old, "noticed" tolerably early and learned one or two of the usual childish words. When however he reached the age of 12 months, to use his mother's words "he seemed to stop short"; his development (both mental and physical) ceased almost completely. He did not walk till he was 3½ years old. When seen, his stature, and one might almost say his intelligence, were those of a child of 2. His head though large in proportion to his height was not so for his age. It was 51 cm. in circumference and well shaped with the exception of some flattening at the vertex; the anterior fontanelle was closed. The hair and eyelashes were normal. The features were broad and coarse, with eyes set widely apart, the root of the nose being flattened while the alae and septum were thickened and the nostrils somewhat dilated. His thick everted lips were habitually open with a large tongue protruding between them. The face looked oedematous, the normal depression between the cheek and the lower eyelid being almost obliterated, but the skin was quite firm to the touch. There was a deep naso-labial line on each side of the mouth. He had only the blackened stumps of his milk teeth worn down to the level of the gum in the front of the upper jaw and in the lower his first teeth set widely apart were decaying and some permanent incisors were making their appearance behind. The thyroid gland was present and could be felt in his short neck, as a small firm immature body. The body was very bulky and the abdomen prominent. He had a small umbilical hernia. His chest was unsymmetrical and he had well marked natural curvature of the spine in

the lower dorsal and lumbar regions. There was also considerable lordosis. His limbs with their bony framework were short and thick, but there was no absolute distortion except a bowing of the tibia with the convexity anterior. The hands and feet were short and broad with stumpy fingers and toes. "The feet are flat and the second toe on each foot is smaller than normal and overrides the rest." The skin was harsh, dry and resistant. III. 4, aged 6 years and 3 months, was 33" in height and weighed 32½ lbs. He cut his first tooth early and was said to be bright as an infant. He did not walk until he was 2 years and 3 months old. He waddled as he walked but he could even run. His head was fairly well shaped with a depression in the region of the anterior fontanelle, which was closed. His hair was normal. The root of the nose was broad and flat and the tip rather turned up, the alae and septum thickened and nostrils broad. He had rather a big mouth with a tendency to remain open. He had his first set of teeth which were set widely apart. His neck was short and thick and the thyroid gland was of much the same character as that of his brother. His abdomen was prominent and he had a small umbilical hernia. His chest was remarkable in the fact that it retained the circular form of infancy. There was slight beading of the ribs. The limbs showed the same peculiarities as his brother's, including that of the second toe of each foot. His perceptive faculties were probably more acute than those of his brother, but his intelligence was extremely limited. Probably sporadic cretinism. (Bibl. No. 404¹, p. 694.)

Fig. 785. *Manouvrier's Case III.* I. 1, was an enameller, very steady and not alcoholic. According to his wife, I. 2, there were no degenerates in either his family or hers. Both I. 1, and I. 2, were well made and of Alsatian origin. They had four children, II. 1—4. II. 1, was a pretty intelligent girl of 9. II. 3, died aged 2, of convulsions. II. 4, was vigorous and healthy. II. 2, aged 7, the dwarf, was microcephalic and a complete idiot though he seemed to recognise his mother and sister; owing to his movements his height could not be measured. The head measurements were as follows:

	1903 Aged 15	1895 Aged 7
Maximum antero-posterior diameter	133 mm.	130 mm.
Metopic antero-posterior diameter	125 "	125 "
Maximum transverse diameter ...	110 "	106 "
Vertical diameter	92 "	85 "
Bi-zygomatic diameter	103 "	94 "
Cephalic index	82.7	81.5

The mother said the forehead had been more flattened at birth, and that the head had greatly increased in size. She had noticed the bregmatic fontanelle did not exist at birth. The four canine teeth were remarkably pointed and sensibly longer than the other teeth; the large tongue was constantly protruded from the half open lips, the ears were normal. Only one transverse palmar fold existed in the L. hand situated nearly in the middle of the palm. The R. hand had not this characteristic. The child had had convulsions when from 2 to 3 months old. The mother stated that during her pregnancy with this child, she had worked in a match factory, by piece-work, carrying heavy loads of wood which she supported on her abdomen. During her other pregnancies her work had been different, either washing or working in a tobacco factory.

An additional notice of this dwarf was published by Manouvrier in 1903. He was then aged 15, and his height was 98.5 cm., but would probably have been 110 cm. if there had not been posterior deviation of the pelvis, with a bending forward of the trunk. The head measurements had not altered much. He had walked from the age of 9 and could pronounce a few words. He had had attacks of epilepsy since 1893. (Bibl. Nos. 302, p. 227 and 441^b, p. 591.)

Fig. 786. *Schmidt's Case III.* "Welsing." I. 1, I. 2, I. 3, and I. 4, were of average height, as were also II. 2, and II. 3. II. 2, was a sailor. III. 1—3, were strong and of normal size. III. 4, aged 15½, was big and strong at birth—and developed remarkably well till about his third year. He learnt to walk and speak like other children. At about 2½ years of age he was vaccinated, but the vaccine took but slightly. Two or three weeks after vaccination he became seriously ill, the chief symptom being continuous diarrhoea, a condition which lasted 12 years (?) and showed the first signs of improvement in the summer of the year he was seen by Schmidt. As a result of this illness he had become weaker and weaker and was so emaciated that he was almost a skeleton. In his fourth year he had measles badly, and from about his tenth year his legs were much swollen from time to time. He had been at school from his sixth to his fifteenth year and in spite of drawbacks kept pace with his companions of the same age. His gait had become tottering during his long illness, he could scarcely walk upstairs and showed a great desire to sleep. Since the diarrhoea had improved, his strength had increased and he had noticeably increased in height, although previously he had grown but little since he was 2½ years old. The parents said he had not suffered from rickets, but Schmidt thought that possibly he had, on account

¹ By an oversight this paper is dated 1902 instead of 1891 in the Bibliography.

of a considerable flattening of the occiput and a pronounced X-position of the legs. The genitals were in a child-like state of development. The mental faculties appeared quite normal. *Measurements.* Total length of body 119.9 cm. Length of head measured from the glabella to the most prominent point of the occiput with head horizontal 168 mm. Breadth of head 144 mm. Perpendicular length of spinal column 53.0 cm. Length of whole arm from acromion to the end of the 3rd phalanx of the middle finger 51.5 cm. Length of leg from trochanter to external malleolus 53.5 cm. A few other measurements are given. (Bibl. No. 270, p. 67 and pp. 69—74.)

Fig. 787. *Schmidt's Case IV.* "Theres Fend." I. 1, I. 2, I. 3, and I. 4, were healthy and of average size, as were also II. 2, and II. 3. III. 1, aged 21, and III. 2, aged 19, were normal and healthy. III. 3, aged 16, was 116.0 cm. in height. Her birth was normal and for the first eight years she was the size of other children, and was never ill. Then came a severe illness, which kept her in bed 14 days and she was delicate for a long time after, and from that time she at most grew 1" to 2" (Zoll). What the illness was could not be ascertained. She had never been ill again. Her body was well proportioned but the head was too small for a girl of 16, but showed no trace of the form of a typical microcephalic skull. The limbs and especially the hands were pretty, with fat and muscles well developed. The whole body would have been handsome, except for the projecting abdomen. The breasts were scarcely noticeable, the nipples quite undeveloped. There was no hair on genitals or axillae, but plenty of hair on her head. The shoulders were broad and the thorax particularly well formed. She said her legs were not the same length, her parents knew nothing of it, but measurements from the trochanter to the external malleolus proved she was correct, for the R. leg was about 0.5 cm. longer than the L. The R. upper and lower eye teeth had only changed at 16 years of age and were merely little points rising from the gums when seen. Her bodily strength was not weak relatively to her small size, but she was easily tired and could only do light physical work. Mentally she was perfectly normal, could write well, read fluently and knew some arithmetic. *Measurements.* Total length of body 116.0 cm. Length of head from glabella to external occipital protuberance 166 mm.; to most prominent point of the occiput when head horizontal 168 mm.; breadth of head 144 mm. Perpendicular length of spinal column 49.8 cm. Length of sternum 11.9 cm. Circumference of chest measured above nipples (average in quiet breathing) 60.0 cm.; of abdomen at umbilicus 59.6 cm.; of hips at crests 60.5 cm.; at trochanters 66.5 cm. Length of clavicle 10.0 cm.; humerus 19.0 cm.; ulna 17.6 cm.; radius 16.0 cm.; hand from end of radius to end of 3rd phalanx of middle finger 13.0 cm.; to beginning of 1st phalanx of middle finger 5.0 cm.; whole arm from acromion to end of 3rd phalanx of middle finger 48.0 cm.; circumference of middle of upper arm 17.9 cm.; maximum circumference of forearm 18.7 cm. Length of femur 28.0 cm.; tibia 25.7 cm.; foot 22.2 cm.; leg from trochanter to external malleolus, R. 53.5 cm., L. 53.0 cm.; circumference of middle of thigh 22.7 cm.; calf 23.9 cm. Other measurements are given. (Bibl. No. 270, p. 59 and pp. 69—74.)

Fig. 788. *Schmidt's Case V.* "Margaretha Reisberger." The account of this family was given to Schmidt by II. 3. I. 1, I. 2, I. 3, and I. 4, were of average height and no case of dwarfism was known in the family except III. 5. II. 2, a peasant, was of average size, and delicate but never ill. He died suddenly aged 62, according to his relatives of apoplexy. His wife admitted he was a drinker¹. II. 3, aged 62, was of average height and had always been healthy. III. 1—4, were of normal height. III. 5, aged 26, was strong when born and had grown like any other child till five years of age and during this time was never ill. Then she had a severe illness which lasted seven weeks, her mother had no idea what it was, and the doctor who had attended her was dead. From the account of the mother it appeared to be a severe general illness. Since then she had not increased in height, but her head had grown and her body and limbs had become thicker. Since this illness, she had never ailed except for pains in the loins from time to time. She went to school for three summers but learnt almost nothing. She followed what was said to her but even her relations found it difficult to understand what she said. Her gait was waddling. She measured 108.3 cm. in height. The muscles were well developed, the breasts undeveloped, the nipples were developed, the genitals without hair and like those of a child. The abdomen was distended and the neck very fat behind. The breadth of the pelvis gave the whole figure a woman's character. The expression of countenance with its projecting lower lip and flat broad nose reminded one of a monkey. She had learnt to sew and knit a little but was chiefly employed in looking after children, which she did in a satisfactory manner. *Measurements.* Total length of body 108.3 cm. Length of head from glabella to external occipital protuberance 169 mm.; to most prominent point of occiput when head horizontal 168 mm.; breadth of head 138 mm. Perpendicular length of spinal column 51.5 cm. Length of sternum 13.9 cm. Circumference of chest above nipples 61.5 cm., average with quiet breathing 55.5 cm.; of abdomen at umbilicus 68.5 cm.; at trochanters 64.2 cm. Length of clavicle 10.9 cm.; humerus 19.4 cm.; ulna 16.5 cm.; radius 14.2 cm.; hand from end of radius to end of 3rd phalanx of middle finger 13.2 cm.; from end of radius to beginning of 1st phalanx of middle finger 6.1 cm.; whole arm from acromion to end of 3rd phalanx of middle finger 47.8 cm.; circumference of middle of upper arm 18.8 cm.; maximum circumference of forearm 18.9 cm. Length of femur 23.7 cm.; tibia 23.0 cm.; foot 15.9 cm.; leg from trochanter to external malleolus 45.5 cm.; circumference of middle of thigh 30.8 cm.; calf 23.7 cm. Other measurements are given. (Bibl. No. 270, p. 60 and pp. 69—74.)

¹ Owing to an error of engraver I. 2 instead of II. 2 has been marked on plate as alcoholic.

Fig. 789. *Schmidt's Case VI.* "Wilhelm Willkowsky." I. 1, I. 2, I. 3, and I. 4, were of average size. II. 2, was a mason and of average size, as was also his wife, II. 3. They had twelve children, III. 1—5, of whom eight, III. 1, died in childhood of acute infectious diseases. III. 2, aged 24, the eldest of the survivors, was a sailor, with rather a big head but otherwise mentally and physically normal. III. 4, aged 17, an errand boy, was normal. III. 5, aged 7, had a skull which was slightly of the hydrocephalic type, but she was otherwise normal. III. 3, aged 20, was a hydrocephalic dwarf. His large head was noticed immediately after birth. He was breast-fed and at first developed well, but at 3 months old he had violent attacks of vomiting which lasted four weeks. He was blind for a year with some disease of the eyes. He never learnt to walk, but grew at first like other children, then more slowly, but growth did not cease altogether. He learnt to speak in normal fashion at first, but stopped speaking in his third year and forgot what he had learnt, he began to learn speaking again in his sixth or seventh years, and according to his mother had learnt to answer a few questions but had forgotten them again. With the exception of the hydrocephalus the body was in proportion and rather fat, but the muscular system was badly developed. The expression of the face was very thoughtful and by no means idiotic. The development of the genitals was not retarded, but the hair was very scanty. *Measurements.* Total length of body 132.0 cm. Length of head measured from the glabella to the external occipital protuberance 200 mm.; breadth of head 175 mm. Cephalic index 87.5. Other measurements on the head and face are given. (Bibl. No. 270, p. 65 and pp. 69—74.)

Fig. 790. *Schmidt's Case VII.* "Struss Family." According to II. 3, I. 1, I. 2, I. 3, and I. 4, had been physically and mentally normal. II. 2, was a master smith and normal. II. 3, was seen by Schmidt and apparently was normal. III. 1, aged 22, the eldest child, was a healthy journeyman smith. III. 3, who was a decided microcephalic, died in his 13th year, he had been 5 or 6 years in the Idiot Asylum at Alsterdorf. No measurements of him are given. III. 2, aged 10, died in the Idiot Asylum, but her parents refused to allow an autopsy. She was a microcephalic dwarf. II. 3, said nothing particular occurred while pregnant with III. 2—3. III. 2, had suffered from convulsions and often cried. Neither III. 2, nor III. 3, had ever learnt to speak nor could they recognise anyone. III. 2, walked at 2 years old but uncertainly. III. 3, could only crawl and apparently had pronounced *pes varus*. They never understood what was said to them. In her 11th year III. 2 was only the size of a five year old child, and III. 3, in his 13th year, only the size of an eleven year old boy. Their growth was slow but constant. *Measurements* of III. 2. Length of head from glabella to external occipital protuberance 127 mm.; to the most prominent point of the occiput, with the head horizontal 131 mm.; breadth of head 117 mm. These measurements (with others) are taken from a cast of the head. (Bibl. No. 270, p. 66 and pp. 69—74.)

Fig. 791. *Baginsky's Case I.* I. 1, had had epileptic attacks till his 8th year. I. 2, was healthy and had never miscarried. II. 1, aged 10, had had epileptic attacks till his 5th year, he had congenital defect of the iris, nystagmus of both eyes and was highly nervous and timorous. II. 2 (no sex given), aged 6, had epileptic attacks till the 2nd year of its age. II. 3 (no sex given), was normal and well developed. II. 4, was born 9.10.1888 and brought to Baginsky on 22.6.1889. The thorax was normal, the extremities abnormally short, firm and thick, and the tibia and fibula were slightly curved. Her expression was imbecile, the root of the nose was depressed and the tongue enormously large. They operated on the tongue and the child died in consequence. There was a post mortem. *Measurements.* Circumference of head 41.5 cm.; of thorax at axillae 36.5 cm.; at height of the xiphoid process 36.5 cm. Length of body 59 cm.; the upper limb from the acromion to the wrist 13 cm.; the lower limb from the iliac spine to the external malleolus 20 cm. Circumference of forearm 12.25 cm.; of calf 15 cm. (Bibl. No. 261, p. 515.)

Fig. 792. *Baginsky's Case II.* Of I. 1, no statement is made. I. 2, was phthisical, but there were no traces of syphilis. Of her seven children, II. 1—7, four, II. 1—4, had died of acute disease. II. 7, born 24.8.1881, was brought to the hospital 25.11.1881. She was a badly nourished child, with thick protuberant tubera parietalia and frontalia and large open fontanelles. The arms and legs were remarkably thick and short with massive bones and large epiphyses. The skin lay in folds on them. Both tibiae were so incurved on the anterior edge that the lower third of the leg appeared to be convex posteriorly and concave anteriorly. She had genu valgum on both sides. *Measurements.* Circumference of head 41 cm.; of upper part of chest 33 cm.; of lower 33 cm. Length of body 50 cm.; upper arm 8 cm.; forearm to wrist 6 cm.; hand from wrist to the tip of the middle finger 5 cm.; the thigh from the iliac spine 10 cm.; the leg to the external malleolus 7.5 cm. (Bibl. No. 261, p. 528.)

Fig. 793. *Baginsky's Case III.* Of I. 1, and I. 2, nothing is stated. II. 8, born 10.6.1886, was brought to the hospital 22.6.1886. No trace of syphilis could be ascertained. She was the eighth child of her parents, three of the others, II. 1—3, had died of acute diseases. The tubera parietalia and frontalia were greatly developed, the face normal, the limbs remarkably short and thick. The right upper limb lay immovable, and exhibited a slight thickening of the humerus in the middle. At any attempt at movement flexibility and crepitation were noticed (fracture of the humerus). The elbow joint was normal. The epiphyses of the humerus and wrist were thickened at both sides. The diaphysis of the L. humerus appeared to be normal. The femora on both sides were thick and curved, the tibiae thick and bent. There was nothing abnormal in the spine. *Measurements.* Circumference of head 34.0 cm.

Upper circumference of chest 32 cm.; lower 32 cm. Circumference of abdomen 35.5 cm. Total length of left upper limb to the wrist 12 cm.; of both legs from the iliac spine to the external malleolus 19 cm. (Bibl. No. 261, p. 529.)

Fig. 794. *Kühn's Case*. I. 1, aged 50, was a robust muscular man almost 6 "Fuss" in height and a mason by trade. He met with an accident and Kuhn was called in and saw his family. His wife, I. 2, was strong, healthy, intelligent and talkative. She was 5 "Fuss" in height. She married in her 25th year and never had had syphilis or any serious illness. Her confinements had been easy and she breast-fed her children to their second year. After her first two boys, II. 1—2, she had a miscarriage, II. 3, a boy. The miscarriage was the result of a fall. Her second daughter, II. 5, died of smallpox in infancy. I. 1, according to all accounts, had led a blameless life both before and after marriage. He was very intelligent. His genitals were normal and healthy. There was no alcoholism and none of their ancestors as far as they knew had been defective either in stature or intellect. The seven children, II. 1—7, had been born at intervals of 3 years, and five were alive. II. 1, aged 24, had a fairly good head-piece, his father had sent him to learn writing and arithmetic in town. His height was "3 Fuss 2 Zoll." He had neither a thick body nor thick head, his limbs were straight and well proportioned, his teeth were white and perfect and there was no eruption on his skin. His hair was long and dark brown in colour, but there was no trace of hair on his face or pubes and he had no sexual feeling. Besides childish diseases, in his 14th year he had a very prominent abdomen, but had no other signs of rickets or worms. He sometimes got sudden violent cramp in his right leg and fell, and he sometimes had catalepsy but his father revived him by rubbing and warmth. He was very strong in the loins and back and could carry heavy loads of wood. II. 2, aged 21, was big and strong like his father, with a wrinkled face, a spiteful, obstinate and ill-tempered disposition, and deficient intellect. He was a big eater and drinker, with a voice like a man, but his genital organs were like those of a two year old boy, there was no hair on chin or pubes and his testicles were the size of those of a cockerel. II. 4, aged 16, was very imbecile, with a face almost like an animal's, and disfigured by smallpox. She could not speak clearly and showed no signs of puberty; she was no taller than I. 1 and should have been marked as a dwarf; her limbs were in proportion. II. 6, aged 10, and II. 7, aged 7, were both "zwei Schuh" in height, their bodies were not deformed and their features were more passable than those of their elder brothers and sister. If spoken to they only laughed foolishly, they could speak no word beginning with a consonant and might almost be considered dumb. Their tongues were thick and large and the other organs of speech could not be examined. (Bibl. No. 39, p. 367.)

Fig. 795. *Depaul's Case*. No statement is made with regard to I. 1. I. 2, aged 38, came for her confinement to the hospital. She was a tall woman of excellent constitution, a washerwoman by trade. She had never been ill and had no trace of scrofula, rickets or syphilis. She had had two boys and a girl, II. 1—3, all normal and well developed, but the boys had died. She then had a miscarriage at six months, male twins, II. 4—5. Her last confinement followed this by eleven years. When II. 6 was born and she saw what he was like, she said she had seen a man with very short arms. II. 6, a boy, was born naturally but died shortly after birth. He had a large head which looked larger than it really was and short limbs. The spinal column was normal but the cervical portion seemed short. The face was normal, the thorax small with ribs regularly curved, but the clavicles were disproportionately long relatively to the size of the thorax, 3.5 cm. without considering the curves, the shoulders were consequently forced backwards. The humerus at each side was much bent anteriorly, the chord of its curve being only 1 cm. in length, the bony surface of the concavity appeared flattened and as if excavated. The radius and ulna, which were parallel, were both 2 cm. in length, but while the radius exceeded the ulna at the lower end, the ulna exceeded the radius at the upper end. The four extremities of these bones were of abnormal volume, especially the lower extremity of the radius and the upper extremity of the ulna. The bones of the hand were regular in form and direction. Both femora were curved in the same direction but the right was straighter than the left. They had first a very marked curvature with the concavity directed backwards and inwards, and secondly a less pronounced curvature with internal concavity. Their lower extremities were considerably enlarged. The tibiae were thick and short, the anterior surface which measured 10 mm. being much shorter than the posterior which measured 18 mm., they were slightly curved with concavity directed backwards and outwards. The fibulae were slightly curved, the concavity being directed forwards and inwards. Their anterior length was 11 mm., posterior length 18 mm., and their extremities were enlarged. The feet were slightly turned out, the vertebral column was of normal height, viz. 15 cm. The child weighed 2700 grammes. *Measurements*. Length from vertex to heel 35 cm.; to coccyx 29 cm.; to umbilicus 25 cm. Head diameters: occipito-mental 13 cm. (skull 10 cm.); occipito-frontal 11 cm.; sub-occipito-bregmatic 10 cm. (skull 9 cm.); bi-parietal 9 cm. (skull 9 cm.); bi-temporal (skull 7.5 cm.); vertical (skull 8.5 cm.). (Bibl. No. 165, p. 643.)

Fig. 796. *James' Case*. I. 1, and I. 2, were normal Hindus; there were no dwarfs among their relations or immediate ancestors. Three of their sons, II. 1—3, were of normal size. II. 4, Piyara Lal, aged 20, was a Hindu goldsmith. He studied at school up to the 5th Primary class and stated that he worked with boys of his own age. He was quite intelligent and seemed quick at grasping new ideas. He had a falsetto voice. The penis and scrotum were small and undeveloped and he had no hair on his

face or pubes. For a native his complexion was very fair. He ran fast and seemed in every way to be an active, sharp-witted youth. The thyroid gland could be felt in his neck. He was said to have ceased growing at the age of 10. His height was 3' 3". Weight 2 stone 11 lbs. The limbs were absolutely symmetrical and their proportions to the head and trunk were those of a man not a boy. Major James considers this a case of infantilism. It may be classed, we think, as ateleiosis. (Bibl. No. 629, p. 445.)

Fig. 797. *James' Case II.* II. 8, Sewa Singh, aged 28, was a Sikh born in the Bikanir State. He was a member of a large family, having had four elder brothers, II. 1—4, and three elder sisters, II. 5—7, and seven younger sisters, II. 9—15, but out of these only two younger sisters were alive. All the others died before they grew up from various diseases. All were said to have been normal in stature and the two living sisters were tall women. Hitherto there had been no dwarfs in the family. II. 8, was 3' 4½" in height and weighed 2 stone 11 lbs. He had good health, led an active life, could play many games besides being a good rider, a roller skater and as sharp as a needle in repartee where banter and pleasantry were concerned. He had slight moustaches which began to appear at age of 25, and a little hair on the pubes but his sexual organs were not fully developed. His voice was small and childish. The thyroid gland was present, there was no deformity or bending of bones, the limbs were quite symmetrical and their proportions to the head and trunk those of a man. Major James considers this also a case of infantilism, probably it may be classed as ateleiosis. (Bibl. No. 629, p. 445.)

Fig. 798. *Sutherland's Case.* As to I. 1, no statement is made. I. 2, was not small. She was said to have had a previous child, II. 1, who only weighed two pounds at birth, it lived 5 months though a seven months child. II. 2, aged 10½, was 38½" in height. I. 2, said she had been frightened by a monkey when six months pregnant with him. The doctor who attended the confinement said he was a midget when born. His mother said he weighed nine pounds at the age of 3. He seemed well formed and no marked physical defects were obvious. The hands were somewhat blue and the finger tips a little clubbed suggesting some congenital defect of the heart but nothing abnormal could be detected. His mother said his actions were like those of a monkey. He was mentally backward, had not learnt his alphabet, and had not begun to talk till he was 4 years of age. His habits were mischievous and destructive. (Bibl. No. 435, p. 192.)

Fig. 799. *Case from Gentleman's Magazine.* This paper gives an account of the sudden death of I. 1, John Marshal, aged 62, who was long known in Leeds as Crutchy Jack. He was not more than 36" in height and was the father of eight fine robust children, II. 1—8, four of whom survived him, the youngest, II. 8, being aged about 5. (Bibl. No. 56, p. 92.)

Fig. 800. *Meige and Allard's Case.* I. 2, married twice and had seven children by each husband, II. 1—14, but it does not state whether II. 14 was the child of the first husband or the second husband. I. 5, had four children, II. 15—18, all healthy. II. 14, and II. 15, were cousins-german but no statement is made as to whether they were paternal or maternal cousins, so which two individuals in Gen. I. were related remains uncertain. II. 14, was still alive, he had always been healthy and never had syphilis, but sometimes drank too much. He was of average height. II. 15, who had died 18 years before, was small in stature. She had had seven children, III. 1—7, of whom III. 7 was the only survivor. All the rest died young, two died at birth, three of meningitis, the last accidentally. The eldest, III. 1, who reached the age of 9, was strong and well-made. III. 7, aged 19, had been sent out to nurse as an infant and was said to have been neglected, he returned to his parents at age of 4, frail and difficult to rear. He did not grow. At age of 6 he had bronchitis and since then had a cough. His limbs were the limbs of a child, and he looked like a boy of 6. He had tuberculosis and Meige states he was certainly myxoedematous. His neck was very short, his shoulders high and his fingers deformed "en baguette de tambour." His intelligence however had not remained stationary, he had always been on a level at school with children of his own age. In mind he was 20 years old. (Bibl. No. 339, p. 106.)

Fig. 801. *Landau's Case.* I. 1, died from haemorrhage [Blutsturz]. I. 2, was alive and healthy as were also II. 1—6. II. 7, aged 29 from Breitenbach near Schettstadt, came to hospital for her first confinement. She could not say when she had learnt to walk, she had scarlet fever at the age of 4 and later had suffered from contraction of the chest and from cough. She was a small dwarfish weakly built brunette, height 129 cm., with poor muscular development. Her expression was childish, the chin retreating, the under-jaw small and the frontal protuberances prominent. The cranial portion of the skull was greatly developed so that the whole head appeared large in proportion to the body. The collar-bones were greatly curved and a distinct rosary existed. The upper extremities were very long relatively to the trunk, and when she stood upright they almost reached the knee. The hands were short and broad with short fingers. There was a moderate degree of genu valgum. The pubes and mons veneris were only slightly developed. During pregnancy she had severe bronchitis. At the beginning of the 10th month the child was born naturally, it was a male infant, small but mature and lived. He weighed 2000 grammes and his length was 45 cm. Landau apparently thinks this case is allied rather closely to cretinism and myxoedema and says this hypothesis is supported by the fact that the woman came from a neighbourhood where cretinism was known to be endemic. No enlargement of the thyroid body could be felt. The head measurements of child are given, but are without value being only to centimetres and not properly defined. *Measurements of Mother.* Stature 129 cm. Circumference of head (glabella-occiput) 51 cm.

Distance from nasion to vertex 10 cm.; from chin to nasion 11.5 cm. Length of upper limb from the acromion to tip of middle finger 60 cm.; upper arm from the acromion to the external condyle of the humerus 26.5 cm.; forearm from the external condyle to end of radius 19.5 cm.; hand from end of radius to tip of middle finger 14 cm.; middle finger 7.5 cm.; thumb 5 cm.; little finger 6 cm.; lower limb from the trochanter to the sole 70 cm.; from the trochanter to external condyle of femur 34 cm.; leg from the external condyle of femur to the external malleolus 31 cm.; foot from heel to tip of great toe 20.5 cm. Circumference of chest over the breasts 63—68 cm. (Bibl. No. 264, p. 6.)

Fig. 802. *Courtois-Suffit's Case*. This was probably a case of infantilism. I. 1, was tuberculous, I. 2, died of heart disease. II. 3, was tuberculous. II. 2, was also tuberculous, the disease began in the spinal column and ended in the lungs and she also suffered from Pott's disease. She died young—she had no miscarriage. Her husband, II. 1, appeared to be well, but looked frail and prematurely old, he was nervous and excessively excitable. He said he never had syphilis or any disease, and was medically examined with a negative result. The couple had three children, III. 1—3. III. 1, died young of croup. III. 2, died young of convulsions. III. 3, aged 23, was a seven months child, weak and frail and was reared with difficulty. He had measles slightly in early infancy but no other disease till he was 13. Till then his growth and intelligence had been normal. At the age of 13, he suffered from intense pain in his head and had to take to bed, and three days later became completely blind and remained so. Afterwards followed a series of symptoms which the doctors called "tuberculous meningitis," they lasted six months. He never had vomiting or constipation but had attacks of delirium followed by stupor. After six months they ceased but his lower limbs became completely paralysed and remained so for another six months. The paralysis passed off and he appeared cured but for eight years after had slight attacks, which finally became regular epileptic attacks. He suffered from intense thirst and from polyuria to a considerable extent. His physical development stopped at 13 and he looked like a boy of 13, but his intelligence was unaffected. The head was well developed and there was no bony deformity in trunk or limbs. The genital organs were those of a child of 13. His height was 130 cm. and his gait rather peculiar. (Bibl. No. 257, p. 588.)

Fig. 803. *Bourneville and Lemaire's Case I*. There was nothing to note in I. 1 and I. 2. II. 5, was neurotic, his brother, II. 4, was alcoholic. II. 5, married II. 6, who was also neurotic, and III. 2 was their son, no other child is mentioned. It is stated that a paternal cousin-german of III. 2, III. 1, committed suicide. III. 2, walked at age of 2 and spoke at 6. He had convulsions at 6, and suffered from "gâtisme," at his entrance to the hospital. His mother had sent him to the country, said he had returned an idiot, and an onanist. He was born October 1873 and came under observation March 1885. The effect of the thyroid treatment was as follows: 1893,—weight 39.5 kilogs, height 140 cm. 1894,—weight 36.4 kilogs, height 141 cm. 1895,—weight 36.5 kilogs, height 142 cm. 1896,—weight 37.0 kilogs, height 144.5 cm. At age of 27 he had grown to the height of 149 cm. Hair and genitals were normally developed. (Bibl. No. 463, p. 387.)

Fig. 804. *Bourneville and Lemaire's Case II*. Nothing is said of I. 1. I. 2, was very neurotic, II. 2, was violent tempered, II. 3, alcoholic, II. 4, neurotic, II. 4 married II. 5, who was neurotic and hysterical, and suffered from migraines and visual hallucinations; her father, I. 3, was passionate and a brother, II. 6, died young of convulsions. There were five children of the marriage, III. 1—5, one of whom a boy, III. 4, died aged 6 of meningitis. III. 5, was born March 1878 after a troublesome pregnancy. She had her first tooth at age of 8 months, walked at 12 months and began to speak at 18 months. She had chorea at age of 1½ years and was passionate during childhood. Her first attack of hysteria was in 1892. She was at La Salpêtrière for nine months and came under Bourneville's care in February 1893. Her height was 143 cm. in February 1896 when thyroid treatment was tried, and in May 1897 her height was 143.5 cm. She left in 1898, married and had a child, IV. 1, aged 4 in 1904, and afterwards a miscarriage, IV. 2. The case is described as dwarfism without infantilism. (Bibl. No. 463, p. 387.)

Fig. 805. *Mary A. Smith's Case*. I. 1, and I. 2, were healthy. They had four healthy children, II. 1. I. 2, was aged 33 when II. 2 was born. The birth was only possible after perforation of the skull. The head of II. 2 was large and long relative to the body and limbs. The arms were not as long as the face was wide, the legs were short and thick, the abdomen enlarged. There were several anomalies in the skull. The femur was stumpy ("plump"), with extremely thick extremities and short diaphysis. The tibia and fibula were thick and short. A long description and very full table of measurements are given, only some of which are reproduced below. *Measurements*. Minimum (owing to injury) horizontal circumference of head 350 mm. Minimum (owing to injury) height of skull 135 mm. Length of L. arm from shoulder joint to end of middle finger 117 mm. Length of R. arm 122 mm.; hand 37.5 mm.; humerus 40 mm.; ulna 37 mm.; radius 33 mm.¹ Distance from antero-superior iliac spine to middle of knee 69 mm.; antero-superior iliac spine to ankle 130 mm.; ankle to tip of great toe 46 mm. Length of the sole 57 mm. Distance from the highest point of the end of head of femur to the lowest point of the internal condyle 55 mm. Length of L. tibia from the internal condyle to inner edge of lower end 48 mm.; to outer

¹ These measurements fail to give total length of arm.

edge of lower end 35 mm. Length of fibula 40 mm.; foot from posterior end of calcaneus to the point of the great toe 56 mm.; clavicle, markedly S-shaped, 34 mm. (Bibl. No. 179, p. 92.)

Fig. 806. *Morley's Case*. I. 1, a small Scotchman, aged nearly 60 and 2' 6" in height, was exhibited at Brookfield Market about 1698. He had been married several years and had two sons, II. 1—2, one of whom used to accompany him. He had kept a writing school at one time. (Bibl. No. 118^b, p. 321.)

Fig. 807. *Colegate's Case*. This case was sent by Colegate to Barlow who described it. No statement is made with regard to I. 1. I. 2, was healthy and had given birth to five healthy children, II. 1—5. II. 6, the sixth child, was extremely blue at birth and only breathed a few seconds. The limbs were stunted in length; the humerus showed relatively large epiphyses and a short stout shaft. The radius showed a remarkable sigmoid curve, an exaggeration of the normal one. The hand was short and stunted. No measurements are given but there is a long description of the brain. (Bibl. No. 210, p. 459.)

Fig. 808. *Uhthoff's Case*. I. 1, and I. 2, were alive and healthy; they had six children, II. 1—6, five were normal, II. 5, aged 15, being 1·66 metres in height. II. 6, aged 14, looked like a child of 9 or 10. She had been perfectly healthy till the age of nine and then got inflammation of the lungs and her growth stopped. She weighed 52 "Pfund" and was 131 cm. in height. The thyroid gland had almost disappeared, there was no trace of myxoedema and her intelligence was intact. She had temporal hemianopsia with descending (absteigende) atrophy of the optic nerves, and hemianoptic reaction of the pupils. The L. eye was quite blind. (Bibl. No. 335, p. 462.)

Fig. 809. *Fischer's Case*. No statement is made with regard to I. 1. I. 2, aged 34, had always been healthy and had never suffered from rachitis or syphilis. She had had three children, II. 1 was born 5 months too soon. II. 2, aged 1½ years, showed evident symptoms of the beginning of rachitis, its joints were swollen and its lower extremities curved. The third child, II. 3, was born at term, but died in consequence of long parturition. She weighed 3200 grammes, length 40 cm. The extremities were very short, thick and deformed with curved bones, they looked like fishes' fins. The head was too large, the neck short and thick, the chest in the neighbourhood of the fourth rib very narrow, and the genital organs normal. The skin felt rough, and in places, especially on the extremities, was in thick folds. The lower limbs were very short and greatly curved, both feet being in varus position. The upper limbs were short and thick, the nails extending beyond the tips of the fingers. There was a distinct rosary. The xiphoid process was split in the middle. The dorsal spine was slightly scoliotic to the left, the lumbar spine very scoliotic to the right. The humerus was curved and its diaphysis and epiphysis were thicker than in normal cases. The radius and ulna were considerably curved, but the hands were normal. The thighs were greatly twisted, so that the patella faced laterally instead of anteriorly without being dislocated; the head and lower epiphysis were much enlarged. The tibia and fibula were so twisted that the concave edges were turned towards each other and the greatest distance between them was 1·1 cm. There was no abnormality in the bones of the foot. Measurements are given. (Bibl. No. 153, p. 46.)

Fig. 810. *Hertoghe's Case*. Of I. 1, and I. 2, no statement is made. II. 1, aged 19, and II. 2, aged 18, had had such serious affections of the throat when II. 1 was aged 21 months and II. 2 aged 7 months that they were not expected to live. They did not walk till they were 7, and were only sent to school at age of 12. II. 2, learnt to read and write but II. 1 objected to learning. They were very slow in their movements and to the superficial glance looked more of the rickety than of the myxoedematous type, to which in reality they belonged. Their abdomens were large and they had umbilical hernia. II. 1, had subclavicular tumours, flat nose, thick lips, and large cheeks, the eyelids were very heavy, the eyebrows had almost disappeared and the hair was very thin. II. 2, had a similar but slightly worse appearance but his eye was livelier and he was more intelligent. They received thyroid treatment. At the beginning of the treatment, 18 August, 1894, II. 1 measured 113 cm. and weighed 27·10 kilograms; at end of treatment 23 July 1895, he measured 125 cm. and weighed 31·00 kilograms. II. 2, in same period increased in height from 109·5 cm. to 118 cm., and in weight from 25·30 kilograms to 28·63 kilograms. (Bibl. No. 304, p. 912.)

PLATE LVIII. Fig. 811. *Mason's Case*. I. 1, I. 2, I. 3 and I. 4, were of the well-to-do farmers' class, all alive and well, their parents had all lived to be old people. II. 5, knew of no case of consumption or scrofula in his family. The family of II. 4 were all healthy except an elder sister, II. 2, who came from North of Ireland to the States, married, and died of some wasting disease after her first confinement. II. 4, was healthy, married when aged about 22, and III. 2 was her first child. The labour was normal. The head presented a square appearance at birth and properly speaking there were no parietal bones. The circumference of the head was 12½". The deficiencies and deformities in the trunk and extremities were more marked on the left side. The clavicles were deficient in thickness, the left broken in the middle. The cartilages of the ribs at their junction with the sternum were moderately enlarged. Both humeri were curved, the convexity being inward, the ends were enlarged, the middle portions deficient and the left was broken. The abdomen was prominent, and was 11" in circumference. The femora were curved with convexity outward. In all the long bones the ends were enlarged and the middle portions reduced. The tibiae were sharply curved, with convexity to the front. The child was tongue-tied. It lived for 3½ days. In the plate accompanying the memoir the limbs look short; no other measurements are given. (Bibl. No. 292, p. 670.)

Fig. 812. *Patel's Case*. I. 1, was very alcoholic but died old. I. 2, died very aged, she was always well and had no miscarriage. Seven of their children II. 1—7, were alive and normal and several of them

had normal children, III. 1. II. 8, Pierre Guilhaumont the youngest, aged 48, was born in the Canton Riotord in Haute Loire, he was deformed and his height was 1.08 metres. He had never heard of any dwarf in the family. He had heard he was born so frail and deformed that it was thought he would never live. He had always been small, but grew a little between 15 and 20, not since. He had had no illness till age of 48. He had gone to school for two years and could write, he answered questions clearly but told lies. He said he never touched alcohol yet he was intoxicated every day. He had a large head and short thick neck. The arms seemed long and slender relatively to the lower limbs and the rest of the body. He had marked scoliosis and lordosis. The thorax was globular, projecting in front, the abdomen large and protuberant. The thighs were very oblique. The femora are said to have met at the level of the internal condyles (*Les fémurs se rejoignent au niveau des condyles internes*), but the significance of this is not quite obvious. The legs were straight and the feet large. Further on the account states that the upper and lower limbs were normal and the hands well formed. *Measurements.* Head: maximum circumference 55 cm.; antero-posterior arc (from the glabella to external occipital protuberance) 30 cm.; transverse bi-parietal arc 27 cm.; maximum longitudinal diameter (the glabella being taken as fixed point) 18 cm.; maximum transverse diameter 15.5 cm., cephalic index 85. Circumference of neck 31 cm. Length of upper arm 24 cm. Circumference of upper arm 19 cm. Length of forearm 21 cm. Circumference of forearm 17 cm. Length of hand 14 cm. Breadth of hand 8 cm. Total length from the acromion to tip of middle finger 57 cm. Length of spinal column from the 7th cervical to base of sacrum 25 cm. Circumference of thorax under the axillae 73 cm.; at nipples 75 cm. Sternal circumference 75 cm. Lower limb. length of thigh from great trochanter to external condyle 25 cm. Circumference of thigh at the middle 33 cm. Distance of inguino-crural fold from external condyle 15 cm. Length of leg from the external condyle to external malleolus 23.5 cm. Total length from the trochanter to the ground 53 cm. Length of foot 18 cm. Breadth of foot 11 cm. It may be noted that the total length of upper limb given does not tally exactly with sum of lengths of the different parts. The right testicle was normal, the left small and defective. Patel says this dwarf had a strong resemblance to the dwarf Anatole described by P. Marie whose height was 1.22 metres (the Anatole of Bibl. No. 371, not the Claudius of our Fig. 674), but Guilhaumont was not achondroplastic, his spinal column was not straight but curved laterally, it described an Italian S exactly; had it been straight the height would probably have been increased by 15 cm. This deformity caused projection of the shoulder blades and the odd configuration of the thorax and abdomen. The upper segments of both limbs were shorter than the lower in Marie's case. (Bibl. No. 391, p. 301.)

Fig. 813. *Boquel's Case.* I. 1, aged 55, was alive and healthy. I. 2, aged 50, was also alive and healthy. She had had eleven children and two miscarriages, II. 1–13. II. 13, aged 25½, began to walk at age of 7½. She had had bronchitis at age of 10. Her height was 132 cm., and she was not vigorous. It was her first confinement. Caesarian section was performed and a male child, III. 1, extracted who weighed 3210 grammes. Mother and child lived. No measurements. (Bibl. No. 377, p. 416.)

Fig. 814. *Arendes' Case.* In this family (Achtermeier) there was no case of dwarfism of either paternal or maternal side except that I. 1, a great grandfather of the mother IV. 2, had been 'very small.' IV. 2, and IV. 3, were normally built, of medium height, of good health, and had never been seriously ill. They were labouring class people at Neuendorf near Duderstadt and had six children, V. 1–6. Three of these children, V. 3 and V. 5–6, had, according to IV. 2, developed normally; V. 2 and V. 4 were dwarfs. V. 1, died aged 3 of convulsions; he was rickety. V. 3, T. A., aged 6, born January 16, 1879, was 112 cm. in height. He weighed 36½ Pfund (18.25 kg.). He had learnt to walk at 1½ years old and had got his teeth on the right side then; evident symptoms of former rickets existed. He had all his milk teeth, some were carious. He had caput quadratum, circumference of head 51.3 cm., a well marked rickety rosary; also thickening of the epiphyses. The tibiae were somewhat curved. Otherwise the boy was healthy and mentally well developed. The sutures and fontanelles were closed and the four first molar teeth had appeared. V. 5, W. A., aged 2, born 14 April, 1883, was 86 cm. in height, weight 12.25 kg. He showed signs of rickets, enlarged epiphyses, but no curvature of his legs. He had all his milk teeth well developed but two. These showed slight rachitic changes. He had a large square head, with the sutures all closed. Had learned to walk early. V. 6, C. A., about 1 year old, born 18 November, 1884, had begun to walk at 1½ years old, could speak a few words, had all her incisors and the first molar teeth above and below on both sides. The epiphyses were slightly enlarged and the skull showed traces of rickets, the fontanelles and sutures were closed. Otherwise she was healthy, walked well, weight 7.5 kg. and was 79 cm. in height. V. 2, Franz Achtermeier, born 12 May, 1877, was aged 8 when he came to the hospital, his brother, V. 4, Karl Achtermeier, born 18 January, 1881, was aged 4. Both children were normally born and of normal size at birth. They learnt to walk at the end of their first year, and never had curved legs or fractured bones. They had teeth at the end of their first year and learnt to speak at the right time, they ate very little but were cheerful and fond of play. V. 2, at age of 2½ had stomatitis (thrush) and quinsy (Rachenbräune) at the same time. In his fourth year he was ordered daily seawater baths. Otherwise he had been healthy. While suffering from prolonged stomatitis he lost his upper incisors and shortly afterwards his other teeth became very bad. V. 4, had apparently never been ill, his teeth were sound for about a year after eruption and then became bad.

The bodies of these boys appeared well nourished, their extremities were remarkably small but apparently in the right proportion to the size of the body—with the exception of the head. Relatively their heads were the largest part of their bodies and especially out of proportion to the chest. They were of caput quadratum form with the vault of the skull flattened and the sutures and fontanelles depressed. The tubera frontalia and parietalia were very prominent. The forehead was much arched, and the back of the head projected noticeably. The facial bones were all too small in comparison with the upper part of the head. In the case of V. 2, the length from the nasion to the point of the chin was 8 cm., and from the nasion to the middle of the large fontanelle 13 cm. The sagittal suture was not closed and was $6\frac{1}{2}$ cm. in length. The frontal suture was also open. V. 4, had the great fontanelle open, it was 2 cm. in length and 1 cm. in breadth. The lesser fontanelle was completely closed, as also the sagittal suture. The hair of both was thin, fair in colour and felt soft. The neck was very short, the circumference of the chest was less than the periphery of the skull. There was no spinal curvature. At the union of the rib cartilages and bones the characteristic rosary beads could be felt, and even seen, though indistinctly. The bones of the extremities were on the whole straight, only the tibiae were somewhat curved. A slight thickening of the epiphyses was noticeable in the forearm. The intelligence of the boys was on the whole good. The elder, V. 2, had been at school for four weeks and according to the father had made good progress. The younger, V. 4, seemed to have more intelligence than his brother. They often slept with half opened eyes. In order to show the growth of the dwarfs, three sets of measurements were taken during their residence at the hospital of which we reproduce the first and last.

Measurements :

	Dwarf V. 2		Dwarf V. 4	
	June 1885	March 1886	June 1885	March 1886
Weight	9·375 kgs.	11·250 kgs.	7·000 kgs.	8·125 kgs.
1. Length of head from vertex to mental point ...	18·0 cm.	18·0 cm.	17·5 cm.	18·2 cm.
2. Length of neck from mental point to upper edge of sternum	6·0 "	6·0 "	5·8 "	5·8 "
3. Length of sternum to extremity of the xiphoid process	10·2 "	10·3 "	7·7 "	8·0 "
4. Length of abdomen from the tip of the xiphoid process to the upper edge of the symphysis ...	18·0 "	19·0 "	17·5 "	18·5 "
5. Total length from the top of upper edge of the pubic symphysis to middle point of internal malleolus	29·5 "	29·7 "	26·5 "	27·1 "
6. Distance of the middle point of the internal malleolus from the sole	3·4 "	3·4 "	2·8 "	2·8 "
7. Transverse diameter of the head above both auricles	14·7 "	14·9 "	13·8 "	13·8 "
8. Direct diameter from the greatest arch of the forehead to the occipital protuberance ...	17·3 "	17·4 "	16·2 "	16·5 "
9. Circumference of head	51·3 "	51·5 "	47·5 "	48·0 "
10. Circumference of chest at nipples	45·2 "	49·0 "	41·2 "	45·0 "
11. Antero-posterior diameter of chest from the middle of the sternum to the spinous process of the 5th dorsal vertebra	12·8 "	13·0 "	11·7 "	12·2 "
12. Transverse diameter of chest	13·1 "	14·5 "	12·2 "	12·8 "
13. Breadth of hips (cristae)	13·2 "	14·1 "	11·7 "	13·1 "
14. Breadth of shoulders	15·0 "	17·0 "	14·2 "	16·0 "
15. Vertex to border of orbit	12·5 "	12·5 "	12·2 "	12·3 "
16. Larynx to axilla	10·5 "	10·6 "	8·5 "	8·5 "
17. Axilla to crest of hip-bone	13·6 "	13·6 "	16·0 "	16·2 "
18. Upper limb	31·6 "	31·6 "	29·5 "	29·6 "
19. Upper arm	12·0 "	12·0 "	10·8 "	10·8 "
20. Forearm	11·1 "	11·1 "	10·3 "	10·3 "
21. Length of hand	8·5 "	8·5 "	8·2 "	8·2 "
22. From crest of hip-bone to the knee	22·0 "	22·3 "	21·5 "	21·7 "
23. From the knee to the sole of foot	19·2 "	19·2 "	18·0 "	18·3 "
24. Length of the foot	12·4 "	12·4 "	10·4 "	10·4 "

Stature	June 1885	March 1886	Normal child of same age
V. 2	75.0 cm.	76.0 cm.	116.0 cm.
V. 4	69.0 „	70.0 „	93.0 „

These measurements are taken from pp. 14 and 24 of thesis, the latter presumably being those of March 1886. Neither is in agreement with the sum of 1 to 6 above, which presumably were not vertical but arcual lengths. (Bibl. No. 227.)

Fig. 815. *Ender's Case*. No statement is made with regard to I. 1 and I. 2. II. 2, aged 27, was a seamstress in poor circumstances with a pale old-looking face and marked rachitis. Her height was '3 Fuss 3 Zoll.' The under jaw extended beyond the upper jaw. She walked with difficulty and took short steps. Both thighs were much curved anteriorly and the lower part of the legs was similarly curved inwards. The knee-joints could not be straightened. The arms were also curved. The spinal column and the rest of the trunk were normal. Caesarian section was successfully performed, the child, III. 1, was strong and healthy and the mother recovered. *Measurements of pelvis*. Diagonal conjugate 3" 4"; external conjugate 6". Antero-posterior diameter of pelvic space 3" 6"; of pelvic inlet 3". Interspinous 8½". Intertrochanteric 10". Pelvic circumference 30". Distance between tubera ischii 2" 9". From tip of coccyx to lower edge of symphysis pubis (pelvic outlet) 3" 3". Distance of L. iliac crest from the symphysis pubis 3" 6"; R. 3" 9". Height of posterior pelvic wall 4"; of pubic arch 1" 4". (Bibl. No. 133, p. 43.)

Fig. 816. *Ornstein's Case*. I. 1, was dead. I. 2, was alive. II. 2, was alive and married; these three were all of middle height and had no deformity. II. 3, Hadsi Konstantinu, born at Lemessos on west coast of Cyprus, aged 39, was a beggar in the streets of Athens. He had a large and quadrate head, prominent forehead, long and strong trunk, good teeth, fairly thick hair, moustache and whiskers, and a short neck. The penis was from 5—6 cm. long and of normal circumference, the testicles were about the size of sparrows' eggs. He had no sexual feeling. His crooked legs were short and muscular, both thighs and legs having the curvature inwards. He had a slight degree of pes varus, and short and fleshy hands and fingers. The plate shows that with hanging arms the tips of the fingers just reached the tops of the thighs. *Measurements*. Height 118 cm. Circumference of chest 90 cm. Total length of arm 42 cm.; leg 35 cm. Span 102 cm. Horizontal circumference of skull 61 cm. II. 3, looks in plate of the characteristic achondroplastic type. (Bibl. No. 272, p. 541.)

Fig. 817. *Nijhoff's Case II. Familiar Rickets*. I. 1, and I. 2, were normal. Of their five children, three were normal, II. 1—3. II. 4, height 96 cm., was a rachitic dwarf, a merchant. It does not state whether he was married or not. II. 5, aged 40, was also a rachitic dwarf and single. Her height was 86 cm. The pelvic measurements were: Interspinous 18 cm. Intercristal 17 cm. Intertrochanteric 20.5 cm. External conjugate 14 cm. Diagonal conjugate 7 cm. She became *enceinte* and caesarian section was performed 9. 11. 1900. The mother recovered, the child, II. 1, was dead. He weighed 3890 grammes and his length was 54 cm. (Sent by the kindness of Professor Nijhoff of Groningen: see Plate NN (82)—(84).)

Fig. 818. *W. Adams' Case*. No statement is made with regard to I. 1. I. 2, aged 41, was a healthy woman who had ten healthy children, II. 1—10. The eleventh, II. 11, was born with the arms shorter than natural and the legs shortened and twisted. It must have been stillborn or died at birth, as the specimen was presented by Dr W. H. Williamson to the (Royal) College of Surgeons (of London). The mother said she had seen a cripple similarly deformed when pregnant. (Bibl. No. 146, p. 263.)

Fig. 819. *Paal's Case*. Of I. 1, no statement is made. I. 2, was told by her father that as a small child she had curved legs, and only began to walk at 3 years of age. Later she was always healthy. She had five children, II. 1—5. II. 1, was stillborn and its arms and legs were not properly formed "auch nicht recht ausgebildet gewesen sein." II. 2, lived for ¼ year. According to the doctor who visited it when vaccinated it had club feet. The mother said it had always been anaemic. II. 3, was normally developed, and looked strong and healthy. II. 4, was stillborn at term and had the same curved and short extremities as II. 1 and II. 5. II. 5, was stillborn, according to the mother it was a seven months child. *Measurements*. Length of body 34 cm. Circumference of head 30.5 cm.; horizontal diameter 9.25 cm.; bi-parietal diameter 7.75 cm.; bi-temporal diameter 7 cm.; greater oblique diameter 10 cm.; lesser oblique diameter 8 cm. There was no craniotabes and the fontanelles were small. The skin of the whole body was firm and much swollen, especially on the extremities. The long bones of the extremities were much curved. The humerus was curved, 4 cm. in length, and its whole diaphysis was completely ossified. The radius and ulna were also ossified, the latter formed a half circle whose diameter from the olecranon to the styloid process measured 2 cm. The lower extremities were O-shaped with decided pes varus. The distance of the greater trochanter from the external malleolus was 7 cm. (Bibl. No. 286, p. 29.)

Fig. 820. *Sonntag's Case*. I. 1, was tall and robust and had always been healthy, he is called the "amicus" of I. 2, so probably they were not married. I. 2, aged 30 in 1844, was of medium height, slight build and healthy appearance and had always enjoyed good health. No certain symptom of rachitis could be found in her, and she said that she and her eight brothers and sisters, I. 3, had all walked when 1 year old. Of her children, II. 1, born 1837, came 14 days too soon but was well formed. II. 2, born 1841, was stillborn and had to be extracted. Its birth took place 52 days too soon. It showed no deformity. II. 3, born 1843, was a well-formed seven months child. II. 4, a male infant, was born alive in 1844, 43 days before its time, and died shortly after birth. The child weighed "unciarum xxx, drachmarum iv et granorum xv." The skin was soft, reddish, and covered with lanugo. The head was very large, almost equalled the rest of the body in length and was covered with hair. The neck was very short, the thorax very short, arched and compressed at the sides (pigeon-breast), the abdomen was distended. The umbilicus was situated "duo circa digitos" above the pubic symphysis. The arms hung near the trunk and were very like the front fins of seals; all the limbs were very short but the hands and feet were beautifully formed. The distance from the middle of the wrist to the tip of the third finger was half the length of the upper extremity. The external genital organs were normal. *Measurements*. Total length 9' 4". Length from vertex to perineum 6' 10"; perineum to soles of feet 2' 6". Vertical diameter of head from vertex to foramen magnum 3' 2". Transverse diameter from one frontal eminence to the other 2' 8". Oblique diameter from the chin to the middle of the lesser fontanelle 3' 3". Diameter from the nasion to the external occipital protuberance 2' 11". Length of upper limb 2' 2". Breadth of metacarpus 8". Length of lower limb 2' 6"; foot 1' 3". Maximum breadth of foot 10". Length of clavicle 1'; humerus from the head to the external condyle 10 $\frac{3}{4}$ "; to the internal condyle 9"; radius 7". Breadth of ulna at elbow 5"; near wrist 3 $\frac{1}{2}$ ". Length of femur 9"; tibia 6 $\frac{1}{4}$ "; fibula 5". The bones of the extremities were curved and the soft palate was cleft but there was no hare-lip. A plate of the child is given. (Bibl. No. 87, p. 1.)

Fig. 821. *Symington and Thomson's Case*. I. 1, aged 26, was healthy. I. 2, who was a year or two younger, was said by the doctor to be epileptic. She had two healthy children, II. 1—2, aged 4 and 2. There was no history of any deformity in the family. About three months before the birth of II. 3, the mother had been violently assaulted by another woman. II. 3, a female foetus, weighed 8 lbs. 2 oz. at birth and had very short, thick extremities marked by deep transverse sulci. The head and trunk were nearly of normal size. The upper part of the head was somewhat enlarged and the fontanelles abnormally open. *Measurements*. Total length from vertex to heel 40 cm. Length from the vertex to the perineum 36.5 cm.; to the umbilicus 28.5 cm.; from finger tip to finger tip with arms abducted at right angles to trunk 28 cm. Total length of arm measured from the base of the axilla to the finger tips 7.6 cm.; lower limb measured from the centre of Poupert's ligament to heel 8.7 cm. Bi-parietal diameter of head 10.8 cm.; occipito-frontal diameter of head 12.3 cm. Circumference of head 20.5 cm. Length of humerus 3.6 cm.; radius 2.7 cm.; ulna 2.8 cm.; metacarpals 1.2 cm.; femur 4 cm.; tibia 3.8 cm.; fibula 3.3 cm.; metatarsals .8 cm. (Bibl. No. 274, p. 237.)

Fig. 822. *Brodowski's Case*. This case is quoted in Virchow and Hirsch's *Jahresbericht* for 1874, and was not seen in the original. Brodowski exhibited two dwarfs before the Warsaw Society of Medicine. They were the youngest children of I. 1, a man of medium height and their older brothers, II. 1, were of normal size. II. 2, aged 20, height 93 cm., weighed 37 "Pfund." II. 3, her brother, aged 17, height 90 cm., weighed 39 "Pfund." Their growth was normal till the age of 8, when it ceased. They looked like children aged 8, but their heads were larger. They had no sexual feeling, and their strength was that of children. They were not idiots. (Bibl. No. 152, p. 300.)

Fig. 823. *Hecker's Case*. No statement is made with regard to I. 1. I. 2, aged 23, was a dwarf with exceedingly short extremities. She had been born with short extremities, learnt to walk at age of 1 $\frac{1}{2}$ years, but at the eruption of each group of teeth, she always forgot how to walk for two or three months. She was so intelligent she decided to become a teacher. She came to hospital for her first confinement. Caesarian section was performed and twins were extracted, a boy, II. 1, weighing 4 $\frac{3}{16}$ "Pfund" and a girl, II. 2, weighing 4 $\frac{1}{2}$ "Pfund," they were both unusually well developed. The children were alive, the mother died 40 hours after the operation and the skeleton came into possession of the Obstetric Clinic. (Photograph given.) *Measurements of skeleton*. Total length 131 cm. Length of spinal column 59.75 cm. Total length of arm 48 cm. Length of humerus 18 cm.; ulna 17.5 cm.; radius 15 cm.; hand 15 cm.; scapula 14 cm. Breadth of scapula 9 cm. Total length of leg 54 cm. Length of femur 26 cm.; tibia 21.5 cm.; fibula 24 cm. Height of foot 6.5 cm. Length of foot 18.5 cm. Circumference of skull 51 cm. (Bibl. No. 131, p. 73.)

Fig. 824. *Guéniot's Case*. I. 2, was very small and deformed, but her height is not given, nor does Guéniot state positively that she was a dwarf. Caesarian section was twice performed on her, the first time in 1891 when a well-developed girl, II. 1, who was alive 3 $\frac{1}{2}$ years later, was extracted. The second operation took place about three years later, resulting in a boy, II. 2, weighing 3000 grammes, who also lived. (Bibl. No. 289, p. 16.)

Fig. 825. *Christopher's Case*. Only a few lines of description of this case were given during the discussion on Morse's paper. No statement was made with regard to I. 1 and I. 2. With regard to II. 1—3, Christopher said, "I have charge of a family of three such children that I have been watching for three or four years. They are not idiotic, but do not do well at school. Dr Walker has charge of them for me and thinks them rachitic but I cannot think so." The fingers were very short, very broad and nearly of equal length, the feet short and legs very short. Their appearance was suggestive of cretinism. (Bibl. No. 416, p. 577.)

Fig. 826. *Chaussier's Case*. No statement is made with regard to I. 1. I. 2, aged 33, was very strong and had always been healthy. She came to hospital for her fifth confinement. It states she had four children previously but does not say whether they were healthy or not. The birth was quick but the child, II. 5, only lived 24 hours. It weighed 2508 grammes and its total length was 30.9 cm. The head was long and large, about one-third the total length of the body, all four limbs were short, thick and stunted, and the surface was deeply furrowed. The bones of the limbs were shorter but larger and thicker than normal, more or less curved, and all showed several fractures, some united and some not. The spine, pelvis and jaws showed nothing abnormal, but the ribs had many fractures. There were 70 fractures in the ribs altogether. (Bibl. No. 57, p. 306.)

Fig. 827. *Rohrer's Case*. I. 1, was a tall, strong man, he had had syphilis. I. 2, died aged 45 of phthisis, she was a tall woman. II. 1, aged 8 weeks, died of convulsions. II. 2, aged 22, slim and tall, was 171 cm. in height. II. 3, aged 20, was 120 cm. in height. He was normal at birth and developed normally. At the age of 2 he fell and hit his head against a chamber utensil, at 11 he fell down the stairs of a cellar and in the same year got a blow on the head from an axe, which resulted in long continued suppuration. Since then he had suffered from incontinence of urine, and his growth and development had stopped. His voice was a boy's soprano. The senses were normal but he was somewhat myopic. His sexual organs were altogether undeveloped, like those of a boy of 6 or 7 years of age. There was no trace of pubic hair. (Bibl. No. 222, p. 197.)

Fig. 828. *Menzies' Case*. Of I. 1, nothing is known. I. 2, died aged 95 years of "apoplexy." II. 2, is stated to be short and stout, and in good health at the age of 70 years. II. 3, died aged 53 years of "paralysis," after a severe illness of five weeks' duration, but had been an invalid for seven years before this. Siblings of these, II. 1 and II. 4, exist but unknown. II. 5, is stated to have died aged 34 years, cause unknown. Stated to have been "tall." II. 9, the youngest of her family, is now aged 69 years 9 months. She is quite healthy and strong. She is taller than her daughter, III. 20, whose height is 5' 6". II. 6, 7 and 8, were all about the same height as II. 9. II. 6, died aged 58 years, cause unknown. III. 1—9, are all of ordinary growth and as far as is known none of them suffer from illness of any kind. III. 1, is unmarried. The others have offspring as shown, IV. 1—5. These are all well-grown, healthy children. III. 10, cabinet maker, aged 37 years, of height 5' 5" without shoes. He is said to be "tired," but shows no other peculiarities. No history of syphilis and no signs of it. Does not remember having had any illness. Physical examination negative. III. 20, aged 35 years, of height 5' 6", a fairly strong and healthy woman, not of neurotic type. She does not remember ever having had any illness. Physical examination negative. She is the youngest of her family. III. 12, died aged 29 years, at a confinement. She is described as "short," but height unknown. To judge from her photograph, which was shown, she was a small and somewhat "wizen" woman. But she was not deformed or in any way diseased. III. 14, and 15, died young, cause unknown. They "were of ordinary size." III. 16, was a soldier who died aged 37 years of "bronchitis." He was a "short" man of about the same height as his sister, III. 20. III. 18 and 19, died young, cause uncertain, but it is thought that this was "bronchitis." They were of ordinary growth as far as is known. All the other members of this generation were of ordinary size and growth and, as far as is known, quite healthy. In the 14th generation IV. 17, 18, 19, 20 and 21 are of ordinary growth and, as far as is known, quite healthy. IV. 22—27, all died young, it is thought of "bronchitis." They were of normal growth. IV. 28, aged 21 years, is a corporal in the army. IV. 6, aged 13 years 7 months, is short and light for age, but is quite healthy and shows no abnormalities of growth. He has a marked left internal strabismus. He has never had any illness of any kind, but was run over at the age of 10 years. He is bright and intelligent. He is in the sixth standard and "does very well at school." His hair and eyes are light. IV. 7, aged 12 years 3 months. Short and light for age, and of distinctly "stumpy" type. She is a healthy, bright, intelligent and amiable child. She shows no abnormalities of growth. She has had chicken-pox but no other illnesses. She is in the seventh standard at school where she "does very well." She has light hair and eyes as her brother has, while both parents are "black." IV. 8, aged 10 years and 5 months, shows a R. internal strabismus but no other peculiarities. She is half a head taller than her sister. She also is a quite healthy, bright, intelligent and amiable child. She is in the third standard at school. She "does well at school but is not so bright as the other two." She has never had an illness. She has dark hair and eyes like her parents. IV. 9, aged 9 years 5 months is rather short and light for age but shows no abnormality beyond a R. internal strabismus. He is in the first standard at school. He is a perfectly healthy child, fairly bright and intelligent. He has never had any

illness. He has dark hair and eyes like his parents. IV. 13, died aged 9 months, of "convulsions" after diarrhoea and vomiting. IV. 15, died aged 1 year 3 months, of "convulsions." IV. 16, died aged 1 month, of "bronchitis." IV. 14, is aged 2 years 3 months, shows no abnormalities and has had no illnesses; a healthy child. Hair and eyes light. IV. 10, E. P., is aged 8 years 2 months. Height $31\frac{1}{8}$ ". Weight 11 kilograms. He shows a marked abnormality of growth. He was born at full term after an uneventful pregnancy and a normal confinement. There was no hydramnios. He was very small at birth, very much smaller than the other children. He seemed to grow slowly until about 4 years of age, when growth seemed to cease; for the last four years he has hardly grown at all, but seems to have begun to grow again during the last few months ("I know this because until then he could not see on to the table, now he can"). Apart from his small size he showed no peculiarity at birth. He had no "snuffles." Breast fed for about five months. Bottle fed until about 14 months. First tooth appeared at seven months. Began to talk at 18 months and to walk at 3 years. He has never had any illness except diarrhoea when teething. "He is a very hearty eater and never ill." He has been at school for three years but is only in the first standard, the same as his sister, nearly two years younger. He does his drawing well but otherwise does not learn with much aptitude¹. He romps about with other children of his age, but on account of his small size, etc., it is proposed, after another trial of four months at the general school, to send him to a special school, if he does not improve. He is quite reliable in such matters as buying such articles as bread, etc. for his mother. Height $2'7\frac{1}{4}"$. A relatively large, high quadrate skull of $19\frac{1}{2}"$ circumference, with bulging forehead, prominent frontal and parietal eminences and relatively small face, the bridge of the nose is very markedly depressed but not broadened; the nose itself is small and straight. The mouth is kept shut, the tongue is not protruded. The proportions are normal, the limbs and spine show no curvatures and there is no rosary or other evidence of rickets. The hands and feet are perfectly formed in every way. The hair and skin are smooth and not dry or scaly, the subcutaneous tissues not increased. The thyroid gland is palpable and is not enlarged. There is no evidence of syphilis or other constitutional disease and physical examination shows that all viscera are normal. He is markedly more sallow than his brothers and sisters and has dark hair and eyes. The extremities of the fingers extend as low as the junction of middle and upper third of the thighs. *Measurements.* Total height $31\frac{1}{8}"$. Lower extremity from antero-superior iliac spine to internal malleolus $15\frac{1}{2}"$. Length of femur from antero-superior iliac spine to articular margin of internal condyle $9"$; tibia from internal condyle to internal malleolus $6\frac{1}{2}"$. The proportions are thus normal for age. Upper extremity from acromion angle of scapula to extremity of styloid process of radius $10\frac{1}{2}"$. Length of humerus from acromion angle to external epicondyle $5\frac{1}{2}"$; radius from external epicondyle to extremity of styloid process $5"$. The proportionate length of segments to one another is thus normal. (Measurements were made between aniline pencil marks over these points.) Maximum circumference of chest $20"$. The mid-point between the vertex and the soles of the feet lies above the upper border of the symphysis one third of the distance between this point and the umbilicus as in the normal for age. All the limbs are fairly stout and well formed. There is no muscular wasting. He is quite intelligent and good tempered. He and his brother, IV. 12, and sister, IV. 11, spend a great deal of their time in laughter. But he has obviously less "vitality" or spontaneity and is more "backward" than they are. Dentition about normal for his age (thus both permanent molars are present in the upper jaws) but many teeth carious. Palate very broad and flat (not high-arched) and as in the normal children seen. IV. 12, W. P., aged 5 years and 4 months. Shows much the same features as his brother, IV. 10, but to a less degree. Thus his height is $34\frac{1}{8}"$, or three inches more than his brother who is nearly three years older than he. The maximum circumference of his head is $20"$ or $\frac{3}{8}"$ greater than that of his elder brother, and his maximum chest circumference is $\frac{1}{2}"$ greater. Born at full term after an uneventful pregnancy and a normal labour. No hydramnios. He was of ordinary size and very fat at birth. No "snuffles." Breast fed nine months. First tooth at $5\frac{1}{2}$ months. Began to talk at 18 months and to walk at 3 years 7 months. "He did not seem to grow after he was 3 years of age." He is quite intelligent², but "he does not run about like the other children, but likes to sit down all the time." Attends school and does fairly well there. He has only once been ill, when, at the age of 1 year 9 months, he "had the yellow jaundice, rickets and diarrhoea," and was an in-patient at the London Hospital for 7 weeks 3 days. Dentition normal for age, teeth sound. Palate higher and narrower (as in IV. 11) than in the normal children. He presents all the features shown by IV. 10, but to a less degree. A relatively large, high, quadrate skull of maximum circumference of $20"$. Bridge of nose depressed, but not flattened; nose short and straight. Face comparatively small; but this feature much less marked than in his brother. He has a distinctly "cretinoid" appearance. The mouth is kept shut and there is

¹ His teacher reports of him: "Very backward for a boy of 8 years. He is only up to the standard of a child of 5 years. His speech is very indistinct. He is fairly good at numbers, adding such numbers as 6 and 5 without effort. He takes a keen interest in stories and can reproduce them. During the last year he has much improved and now seems to take a real interest in his work."

² His teacher reports of him: "He has only attended school for 4 months. He makes very feeble attempts at writing and drawing. He can count a very little. His idea of number is poor and below the average. His speech is very indistinct, and it is often quite impossible to understand him. He takes a keen interest in home affairs and answers intelligently questions relating thereto. He is constantly sucking his thumbs and first fingers."

no protrusion of the tongue. He is somewhat "adipose," the subcutaneous tissues being very thick, the hair and skin are, however, normal and not dry, rough, or scaly. The hands and feet are normal in every way. The thyroid gland is palpable and not enlarged. There is no rickety rosary or other evidence of rickets, of syphilis, or of other constitutional disease, and physical examination is negative. He shows no deformity of any kind. *Measurements.* Height $34\frac{1}{8}$ ". Lower extremities: antero-superior iliac spine to internal malleolus $15\frac{1}{2}$ "; length of femur, antero-superior iliac spine to articular margin of internal condyle $8\frac{1}{2}$ "; tibia, internal condyle to internal malleolus $7\frac{1}{2}$ ". Mid-point between vertex and soles falls about $1\frac{1}{2}$ " above upper border of symphysis pubis, as in the normal for age. Upper extremities: acromial angle of scapula to extremity of styloid process of radius $10\frac{1}{8}$ "; length of humerus, acromial angle to external epicondyle of humerus $5\frac{1}{8}$ "; radius, external epicondyle of humerus to extremity of styloid process of radius $5\frac{1}{8}$ ". The proportions are thus normal for age. Circumference of chest $20\frac{1}{2}$ ". This child has dark hair and eyes like his brother, IV. 10, and his father and mother. His complexion, like that of IV. 10, is more sallow than that of the other children. IV. 11, L. P., aged 6 years 9 months. Height $37\frac{1}{8}$ ". As regards the cranium she presents some of the features shown by IV. 10 and IV. 12 (though to a less marked degree), and she is very small for her age. The cranium is, relatively to the size of the face, a little larger than normal at her age, somewhat high and distinctly quadrate. Its maximum circumference is $19\frac{5}{8}$ ". But the parietal and frontal eminences are not so markedly prominent as in the other two cases, the forehead is only slightly bulging; the bridge of the nose is depressed but not exceedingly so. She is not very much smaller, for her age, than her sister, IV. 7, whom she resembles further in having light hair and eyes. Apart then from her small height and the cranial peculiarity she shows no abnormality, and compared to her two brothers might be described as a partial case. She looks an intelligent, healthy child. She "does very well at school," where she is in the first standard¹. She appears to be of very amiable disposition and "is always laughing." She has never had any illness. Dentition is normal and all the teeth are quite sound. The palate is more high-arched and narrower, as in IV. 12, than in IV. 10 and the other children. The skin, hair, hands and feet show no peculiarity. The subcutaneous tissues are not increased. The thyroid gland is palpable and not enlarged. There is no evidence of rickets, syphilis, or other constitutional disease. Physical examination is negative. She shows no deformity of any kind, and the proportions are normal for age. The limbs are well formed and fairly strong, and show no muscular wasting. *Measurements.* Height $37\frac{1}{8}$ ". Maximum circumference of cranium $19\frac{5}{8}$ ". Lower extremity: antero-superior iliac spine to internal malleolus $17\frac{1}{2}$ ". Length of femur, antero-superior iliac spine to articular margin of internal condyle $8\frac{5}{8}$ "; tibia, internal condyle to internal malleolus $7\frac{3}{8}$ ". Upper limb: acromial angle to extremity of styloid process $11\frac{1}{2}$ ", made up of humerus $6\frac{1}{2}$ ", radius $5\frac{1}{4}$ ". Maximum circumference of chest $19\frac{5}{8}$ "; of head $19\frac{5}{8}$ ". She was born at full term after an uneventful pregnancy and a normal labour. There was no hydramnios. She was of ordinary size at birth and was "a fine fat child." No "snuffles." Breast fed 10 months. First tooth 9 months. Began to talk and to walk at 1 year 4 months. She has grown slowly until about nine months ago, but does not seem to have done so since then. In this family and its antecedents and collaterals there is no history, as far as is known, of mental or nervous disorders, tuberculosis, syphilis, or any other disease. (Unpublished case. Reference to the family was provided by Dr Menzies and the above report is due to Dr Rischbieth, who expressed doubts as to classification.)

Fig. 829. *Levi's Case III.* The father and mother, I. 1 and I. 2, were Jews and first cousins. I. 1, aged 46, height 162 cm., was well built, vigorous and very intelligent. As a young man he had four blenorrhagic infections and soft chancres but he denied syphilis. His wife, however, had had four miscarriages and his children showed suspicious signs. I. 2, aged 47, height 158 cm., had irregular and bad teeth and was very irritable. II. 2, aged 22, height 161 cm., was delicate in appearance and, like her mother, suffered from dyspepsia and headache. She showed no trace of rachitis or hereditary syphilis. She married II. 1 when aged 20, and had a child, III. 1, which died a few days later. She was very intelligent. II. 3, miscarriage at three months. II. 4, miscarriage at four months. II. 6, aged 19, height 160 cm., was a tall, thin boy. He had very defective and irregular teeth and a vaulted palate. The sexual functions and intelligence were normal; right testicle palpable in inguinal canal, but not descended. II. 7, aged $16\frac{1}{2}$, height 145 cm., was small, strong and vigorous with good teeth. She was very intelligent. II. 9, aged 10, height 120 cm., was a fine strong girl. II. 10, aged 5, height 106 cm., was weakly; his teeth were defective and he showed some signs of rachitis. II. 11, miscarriage at two months. II. 12, miscarriage at three months. II. 5, aged $20\frac{1}{2}$, was born at term, was breast-fed, but small and weak from birth. She grew normally till her tenth year, and then growth was checked. At 17 she suffered from anaemia. At age of 18 in 1906 her sight became affected and two months later she could not walk in the streets alone. She had frequent headaches. She came to hospital in 1907, but there was no improvement. She returned in 1908. All parts of her body were in proportion, the hands and feet well made. There was no rachitic symptom, the glandular system was normal, the genital organs infantile.

¹ Her teacher reports of her: "Though really a bright little girl, she sometimes appears backward owing to shyness and indistinct speech. At numbers and at writing she is equal to the best in the class but she is rather backward in reading. She shows a keen and intelligent interest in stories and in games."

A very detailed description of her condition is given. The mental condition appeared normal at first but examination showed some slight defects. Measurements are given below. II. 8, aged 15½, was born normally and breast-fed. At first she had excellent health. Her parents said her growth had stopped at age of 8. There was no trace of sexual development, the genital organs were infantile. All parts of her body were in proportion. Her mental development resembled that of her sister but she was more lively. A detailed description of her is given.

	II. 5	II. 8
<i>Measurements:</i>		
Total height	133 cm.	130 cm.
Height of trunk when sitting from ischium to vertex	66 "	64 "
Maximum circumference of skull	49.5 "	51 "
Fronto-occipital diameter	160 mm.	175 mm.
Maximum parietal diameter	135 "	140 "
Bi-temporal diameter	115 "	120 "
Bi-frontal diameter	98 "	90 "
Circumference of thorax at nipples	64 cm.	61 cm.
Circumference of abdomen at umbilicus	65 "	58 "
Length of whole arm	57 "	60? "
Length of upper arm	25 "	25 "
Length of forearm	17 "	22 "
Length of hand	15 "	16 "
Length of lower limb from antero-superior iliac spine to heel	77 "	80 "
Length from great trochanter to heel	71 "	73 "
Length of thigh from great trochanter to articular line of knee	33 "	35 "
Length of leg from this point to lower extremity of internal malleolus	32 "	35 "
Maximum length of foot	21.5 "	23 "

Said to be infantilism of "type Lorain." (Bibl. No. 588, p. 298.)

Fig. 830. *Schmidt's Case VIII.* "Peter Rose." I. 2, said no case similar to that of II. 2 had occurred in the family. I. 1, had died of phthisis. I. 2, had fallen in the seventh month of her pregnancy with II. 2, and she had three normal children, II. 3—5, after II. 2. The account does not say whether or not she had children older than II. 2. The family had always been poor and needy. II. 2, aged 19½, was of height 128 cm. He was born an idiot. He learnt to walk at 4 years old. His head was symmetrical and of normal size. His speech was difficult to understand. He had never suffered from epilepsy. His mother said he had had a good appetite, had always been clean in his habits, and had never been ill till he went to the Idiot Asylum. Schmidt saw him after he had been 11 years in the Asylum, he was then phthisical, coughed, had no appetite and his limbs were flabby and extremely emaciated. His genitals were still in a childlike condition, the hair had just begun to grow, but was absent in the axillae. Both feet showed a tendency to pes varus. His expression was idiotic, he could only speak a few words with difficulty and could not use his hands, which were always kept flexed. He had a dragging gait. The various parts of the body were in proportion. *Measurements.* Total length of body 128 cm. Length of head from glabella to external occipital protuberance 169 mm.; breadth of head 140 mm. Length of whole arm from acromion to end of middle finger 560 mm. (Bibl. No. 270, p. 64 and pp. 69—74.)

Fig. 831. *Schmidt's Case IX.* "Heinrich Nisse." I. 1, was a healthy labourer not alcoholic. I. 2, was healthy. I. 1, and I. 2, had seven children, II. 1—7. II. 1, was hydrocephalic. II. 2—4, and II. 6—7, were healthy. II. 5, aged 17, was a congenital idiot and a dwarf, there was no similar case in the family. He entered the Idiot Asylum at age of 9, and the doctor of the Asylum said that then the growth and development of his body corresponded tolerably well with his age. The muscular system especially that of the lower limbs was weak and the shape of his head was somewhat distorted. He was always dribbling. He knew his name and could make his wishes and needs known to others but could not dress himself. He only learnt at 8 years of age to walk alone. Schmidt saw him eight years later. His body had the proportions of a child. The genitals were not in proportion, the testes being atrophied while the penis was fairly well developed. His skull was unsymmetrical and too small for a boy of 17—the horizontal circumference being 475 mm. The spinal column in the thoracic part was slightly curved to the left and in the sacral part to the right, he was flat-footed and his gait was unsteady.

During his residence in the Asylum his mental faculties had improved. He had become clean, had ceased to dribble, and could dress and undress himself. He attended the kindergarten. *Measurements.* Total length of body 11.49 cm. Length of head from glabella to external occipital protuberance 156 mm.; to the most prominent point of the occiput, when head is parallel to the horizontal plane 162 mm.; breadth of head 132 mm. Perpendicular length of spinal column 572 mm. Length of sternum 132 mm. Circumference of chest measured at the nipples, average with quiet breathing 652 mm.; abdomen at umbilicus 570 mm.; hips at crests 559 mm.; at trochanters 560 mm. Length of clavicle 118 mm.; humerus 236 mm.; ulna 179 mm.; radius 175 mm.; hand from end of radius to end of the middle finger 140 mm.; from end of radius to beginning of first phalanx of middle finger 70 mm. Total length of arm from acromion to end of middle finger 515 mm.; circumference of upper arm at middle 155 mm.; maximum circumference of forearm 172 mm. Length of femur 310 mm.; tibia 286 mm.; foot 210 mm.; leg from trochanter to external malleolus 590 mm. Circumference of middle of thigh 305 mm.; calf 205 mm. (Bibl. No. 270, p. 64 and pp. 69—74.)

Fig. 832. *Flemming's Case.* No statement is made with regard to I. 1. I. 2, was anaemic but otherwise healthy. She had one healthy child, II. 1, and in the eighth month of her pregnancy was confined of a stillborn male child, II. 2. This child had a remarkable appearance. Except for the enlarged belly there was little to note in the trunk, the head was rather large but soft and shapeless, the face expressionless and heavy, the nose wide and flat, the skin about the neck very thick. The limbs were very short in proportion to the trunk, they were markedly curved and bent; with relatively small hands and feet. The width from shoulder to shoulder was normal, but the arms were very short and deformed, the upper arm and forearm both bent to nearly a right angle, the concavity being forwards and inwards; the wrists were markedly pronated. The hands were very small but not deformed. The legs, like the arms, were short and bent; the curve of the thigh was a double one but not so acute as in the arm; the most marked curve was at about the junction of the lower and middle thirds and had its concavity forwards; above this was a slight curve backwards and a little inwards. The legs had the most marked deformity of all, being bent backwards to less than a right angle. The feet were in a position of equinovarus due to deformity rather of the leg than of the tarsus. The writer considers the case as one of achondroplasia. (Bibl. No. 355, p. 21.)

Fig. 833. *Sandel's Case.* Sandel says the growth of these two dwarf children was stunted by bad nursing and that the boy was an example of the "perniciousness of the practice so common among the lower class, both in Stockholm, here (Hedemora) and other places, to give their children bread dipped in brandy for laying them quietly to sleep." I. 1, was a sailor; he and his wife, I. 2, were of medium bulk and stature. II. 1, aged 9, would have been reckoned short for age of 4. No further particulars are given about her. II. 2, aged 7, was so small that he would not have been taken to be above 2. When stripped and weighed, he weighed 15½ lbs. and his total height was $\frac{5}{4}$ of an ell and 1 inch (the Swedish ell is but 2 feet). The calf of his leg measured 9" round, his arm 5" and his belly $\frac{3}{4}$ of an ell and 4 inches. His head was no more than proportioned to his body, his limbs in no part exceeded the natural size and no mark of rickets was to be seen on him. His back was also free from any defect. His skin was soft, flaccid and of an uncommon dryness. His face of mulatto complexion, though this might be owing to sun and air. Possibly chronic alcoholism of childhood. (Bibl. No. 26, p. 68.)

Fig. 834. *Schmidt's Case X.* "Jakob Maier." I. 1, I. 2, I. 3, and I. 4, were of average height. II. 2, tall, strong and well proportioned, died aged 57, from 8 to 14 days after the excision of a "wart" on his lip (probably a malignant tumour). He tore off the bandage and bled to death. II. 3, well built and strong, of average height, died aged 65, of "dropsy of the heart" (Herzwassersucht). III. 2, aged about 46, was well built, strong and cheerful. She appeared very intelligent and gave the account of her brother, III. 5, with intelligence and certitude. She had married a healthy countryman, III. 1, but had no children by the marriage. Before marriage she had two illegitimate daughters, IV. 2—3, both quite normal. IV. 2, aged 25, was married and had two normal children, V. 1—2. IV. 3, aged 23, had an illegitimate child, V. 3, who was also well formed and normal. III. 4, died aged 6 months. It was "like other children." III. 5, the microcephalic dwarf was born 1859 and died 1878, aged 18. When born he appeared normal, but at the age of 6 months it was noticed he was not all right. For the first year he grew quickly then more slowly till his 7th year and from then very slowly, but he always continued to grow a little except the head which remained the same size. His mental faculties were of the lowest grade, he never learnt to eat alone, or to distinguish any one except his mother. In general he appeared to notice nothing, played with nothing and lay almost motionless. He was very thin, with little strength, and very badly developed muscles. He often had a violent cough. His hair was fine and fair. His fingers had to be kept bound up, as he was constantly biting them. His skeleton measured about 93.0 cm., and he looked like a 4 year old child except for his powerfully developed teeth. The skeleton appeared well proportioned and even the microcephalic skull was symmetrically formed. A very long table of measurements is given, only the most important are

reproduced below. (Schmidt gives photographs of skeleton and skull.) *Measurements.* Total length of body 93.0 cm. Circumference of skull 590 mm. Length of skull from glabella to external occipital protuberance 133 mm.; to most prominent point of the occiput, parallel with the horizontal plane 132 mm. Length of skull measured as 'Intertuberallänge,' without paying attention to the horizontal plane, from a point in the middle of the line joining the tubera frontalia to the external occipital protuberance 132 mm. Breadth of skull 111 mm. Height of skull between basion and vertex 95 mm. Vertical length of spinal column 380 mm. Cervical portion of spinal column 70 mm. Dorsal portion of spinal column 150 mm. Lumbar portion of spinal column 86 mm. Length of clavicle 83 mm.; humerus 165 mm.; ulna 141 mm.; radius 132 mm.; femur 247 mm.; patella 27 mm.; tibia 182 mm.; fibula 179 mm. (Bibl. No. 270, p. 55 and pp. 69—74.)

Fig. 835. *Langdon Down's Case.* I. 1, and I. 2 were healthy, there was no history of mental or physical deviation on either side. I. 2, stated that her first child, II. 1, was perfectly healthy until it died from measles. I. 1, about that time gave himself up to intemperance and I. 2 subsequently gave birth to a child, II. 2, who had the same physical peculiarities as II. 3, it died aged 3. II. 3, aged 5, like II. 2, was procreated while I. 1 was suffering from alcoholic intoxication. Then followed a miscarriage, II. 4. After this I. 1 became sober, thrifty and prudent, and II. 5, aged 16 months, was born. It was normally developed and in good bodily and mental health. II. 3, was only 22" in height, she could not speak or walk but could stand with the help of a chair. There was no deformity of body or limbs. The face was of earthy complexion and the integument generally had a wrinkled appearance, as if it were too large for the diminutive body. The hair was sparse and coarse, the eyebrows obliquely placed, the tongue large and rugous. On each side of the neck above the clavicle there was a venous tumour. She understood what was said to her, but her mental condition was that of a child of 15 months old. (Bibl. No. 140, p. 419.)

Fig. 836. *Taruffi's Case IV.* A longer description of this case is given by Taruffi in another paper (Della Microsomia, *Rivista Clinica di Bologna*, 1878, Nota 5). He states that the following is a condensed description. I. 1, and I. 2, were normal, and had six normal children, II. 1—6. II. 7, Tommaso Businaro, was born 1855. The pregnancy of his mother with him was normal. When aged 5 months he was vaccinated and became eczematous on the arms and afterwards on the thorax and this affection lasted for five years, producing a remarkable retardation of growth. When examined in 1875, his height was 70 cm. Taruffi saw him in 1877 and his height was then 110 cm., so he had grown 40 cm. in two years. He had a well formed skull, the nose was short and depressed at the bridge. His arms were rather short, the forearms were however relatively to the humerus rather long. A similar disproportion existed between the two segments of the lower limbs. There was no hair on the chin or pubes, the testicles were very small and he had no sexual instincts. His intelligence was defective, he could neither read nor write and was idle, passionate and obstinate. The case may be one of cretinism or syphilis through vaccination. *Measurements.* Horizontal circumference of head 49.5 cm. Length of arms 17.2 cm.; legs 52.0 cm. Cephalic index 82.31. (Bibl. No. 248, p. 447.)

Fig. 837. *A. Marie's Case.* We are indebted to Dr A. Marie for the particulars given below of this case, which he most kindly sent us. Dr Marie saw these four dwarfs at a fair or "Kermesse," and could only observe them cursorily. I. 2, the mother, had died of chronic tuberculosis, she was rachitic and said to be alcoholic (buveur). No note of I. 1, the father, or any other relatives is given. II. 1, the eldest dwarf, was a case of simple infantilism. The two next, II. 2 (erroneously marked tubercular in pedigree) and II. 3, had round faces (faces lunaires), "les mains en palette," the segmental shortening of the limbs characteristic of a myxoedematous condition ("d'un état strumprive") and diminished vitality combined with arrest of the skeletal development. The youngest, IV. 4, had less oedematous infiltration, but on the other hand his skin seemed old and wrinkled, and his appearance was more markedly cretinoid. (Plate JJ (72).)

Fig. 838. *Horand's Case II.* I. 1, was healthy, neither syphilitic nor tuberculous, but "il buvait du vin comme un bon vigneron." He was 1.55 m. in height and was aged 36 at the birth of II. 3. I. 2, was healthy, did not suffer from myxoedema, tuberculosis, rheumatism, alcoholism or any nervous disease. She had three children, II. 1—3, and was aged 32 at birth of II. 3. II. 1, aged 14½ years, was 1.50 m. in height and very intelligent. II. 2, aged 10½ years, was 1.20 m. in height and intelligent. II. 3, was aged 6. I. 2, had threatened miscarriage with escape of waters two months before the birth of II. 3; otherwise the pregnancy was normal. The confinement was normal, the child was well formed but very small. It was breast-fed for one year. For two years she weighed 7.50 kilos. She had no illness, but whooping-cough followed by bronchitis with oedema of feet and hands. In 1903 she fell from a chair on her head and was for two months in "coma vigil." In 1904 she had "thrush." Her circulation was bad. She walked late, could not even walk alone at age of 6. Her intelligence was defective, she seemed to understand everything, but had never spoken except to say "papa," "mamma." She was very merry but irritable. Her dentition was good. The skull was oval in shape; the anterior fontanelle still

persisted. She had a large, round, rather flat nose, a normal tongue and palate and a neck so short as to be almost absent. The thyroid body was absent, and the genitals but little developed. The upper limbs were normally formed. The fingers were fairly long. With the arms extended by the sides the middle finger reached to the upper half of the thigh. At 6 years of age measurements were as follows. *Measurements.* Weight 9 kilos. Height 62 cm. Occipito-frontal circumference of head 47 cm. Circumference of trunk 49 cm. Both humeri 10.25 cm.; both ulnae 9 cm.; both radii 9 cm.; both femora 15.5 cm.; both tibiae 11 cm. The lower limbs looked like sticks; the nails and toes were short. Sensibility was normal. Probably cretinism. (Bibl. No. 486, p. 930.)

Fig. 839. *Clauder's Case.* There is really no description given of this case, all that is stated is "Sic maritus quidam cum uxore generavit octo liberos utriusque sexus, quorum pars dimidia fuere nani, ubi praecipue notabile alternatem semper esse productos modò solitae magnitudinis, modò nanos." So apparently I. 1, and I. 2, were normal, and of their eight children, II. 1—8, four were dwarfs whose births alternated with those of the normal children; this alternation of births is similar to that in the Boruwlaski family. (Bibl. No. 14, p. 543.)

Fig. 840. *Zweifel's Case,* given by Caruso. I. 2, aged 21, was rickety and scrofulous, she began to walk at the age of 4 and at 15 had periostitis of the right upper arm. She was a healthy looking, strongly built, well nourished person with rickety rosary, genu valgum and thickening of the epiphyses. Her height was 120 cm. She came for her first confinement, Caesarian section was performed and a female child extracted. Weight 2950 grammes, length 49 cm. (Bibl. No. 241, p. 219.)

Fig. 841. *H. D. Smith's Case.* I. 1, had black blood in her, was dark, either half-caste or quadroon. I. 2, was pure white. No note is made of any of their children except II. 3, who became a missionary. Of his 22 children by his first two wives, II. 1, and II. 4, eight died apparently young, they were all normal, but it is not certain whether three or four of the first family died, or four or five of the second. The numbers in pedigree are those which are thought correct, namely that three, III. 6, died in first family and five, III. 16, died in the second family. There appears little to note in the normal descendants of II. 3, except a tendency to dark colour. III. 2, died unmarried. III. 5, is quite dark, practically a coloured man, and his children, IV. 2, are dark with woolly hair. The dwarf, III. 12, is very ugly, but it cannot be definitely stated how he should be classified, probably he is an achondroplastic dwarf, as he is said to have a large head and short legs which are not bowed. III. 13, a girl came from England, and was married to him. They have three children, IV. 9—11, two of whom are dwarfs. III. 12, has been off and on in the public service of his state and is said to be clever at his work. Some of the brothers of III. 12 are professional men. (Unpublished.)

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B. = *Bibliography* (Bibliography numbers in italics signify that the dwarf is referred to in original although not mentioned in the résumé given), *Ic.* = *Iconography*, *Pl.* = *Plate*, *F.* = *Figure of Pedigrees*, *p.* = *Page of Text*.

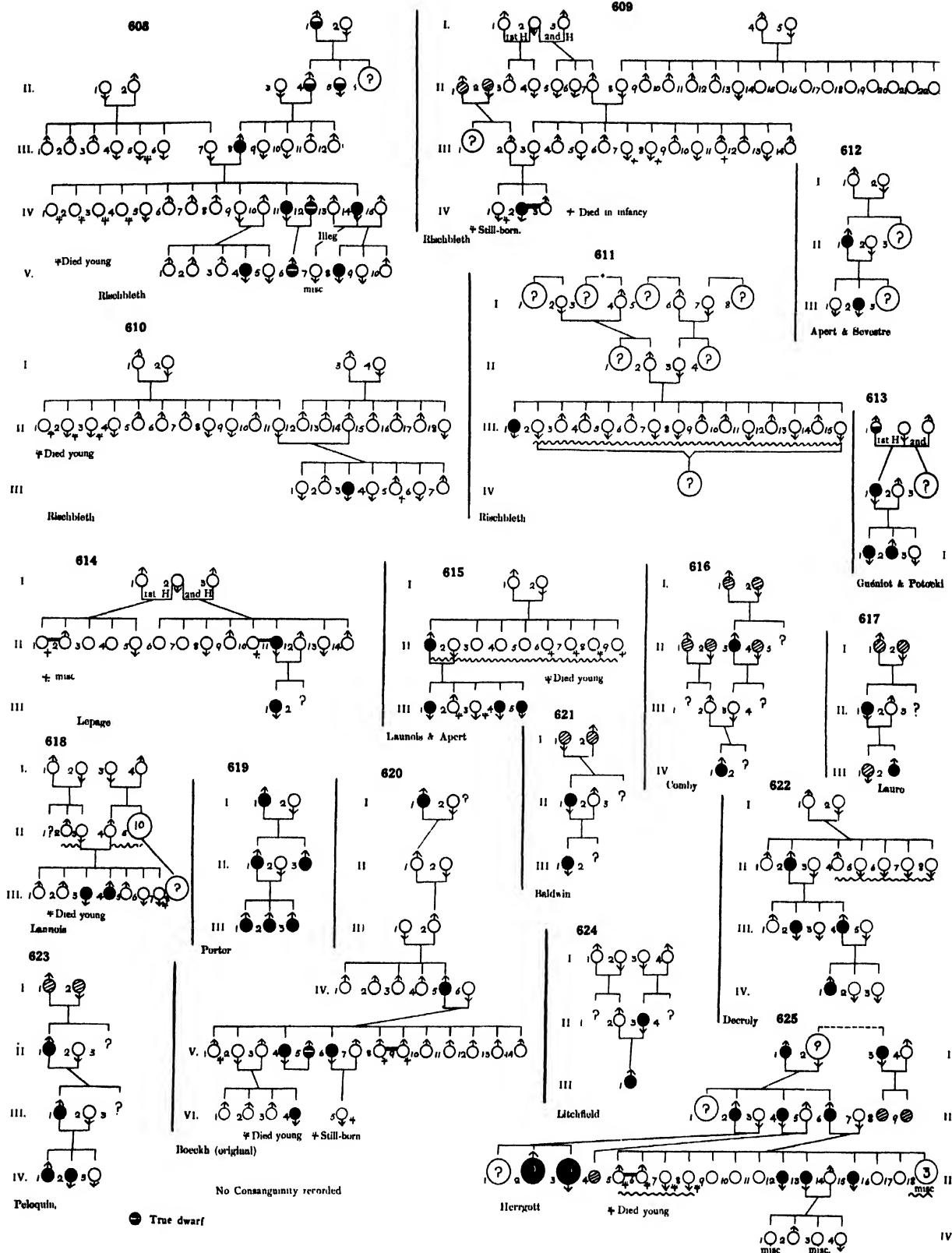
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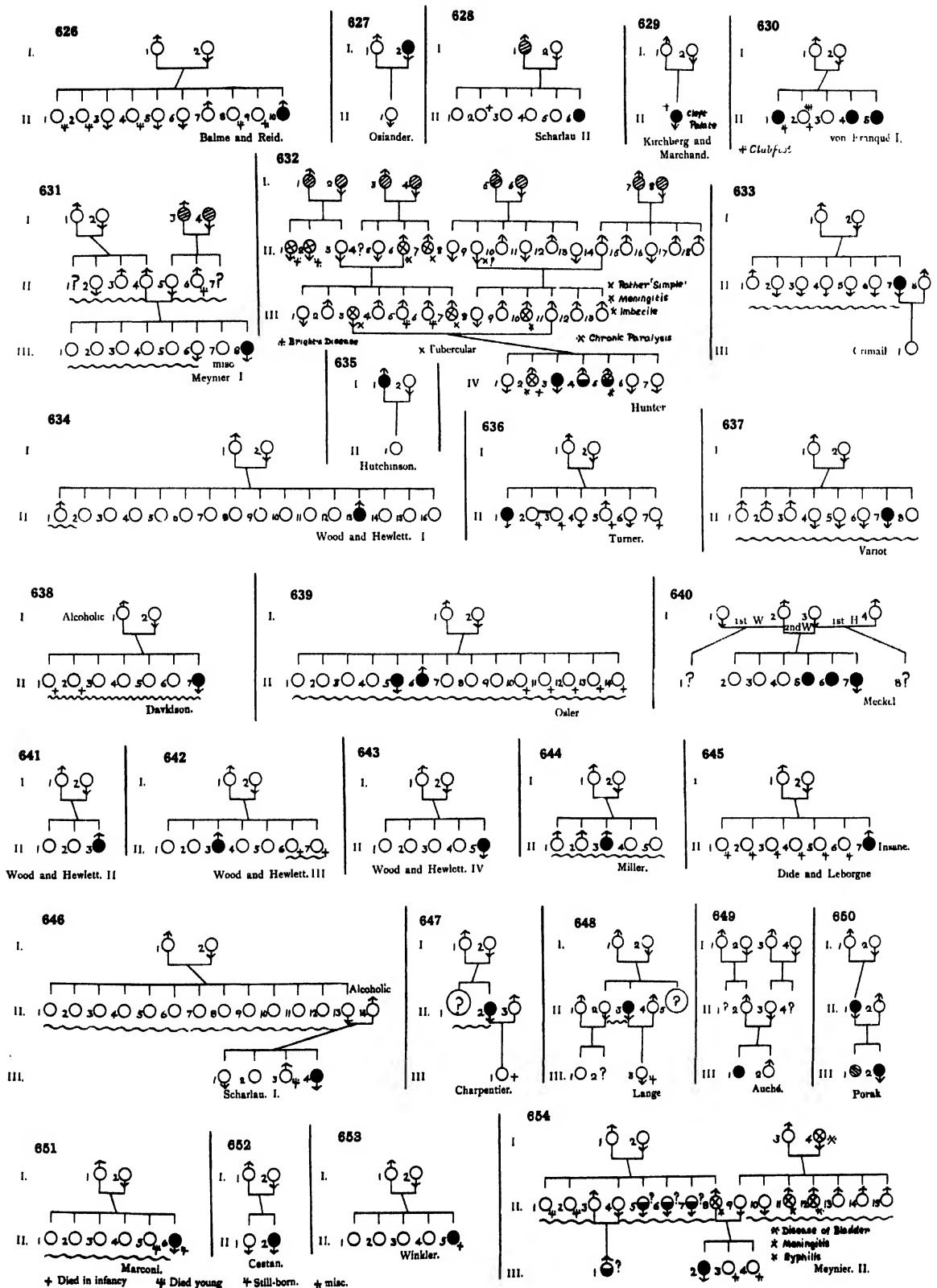
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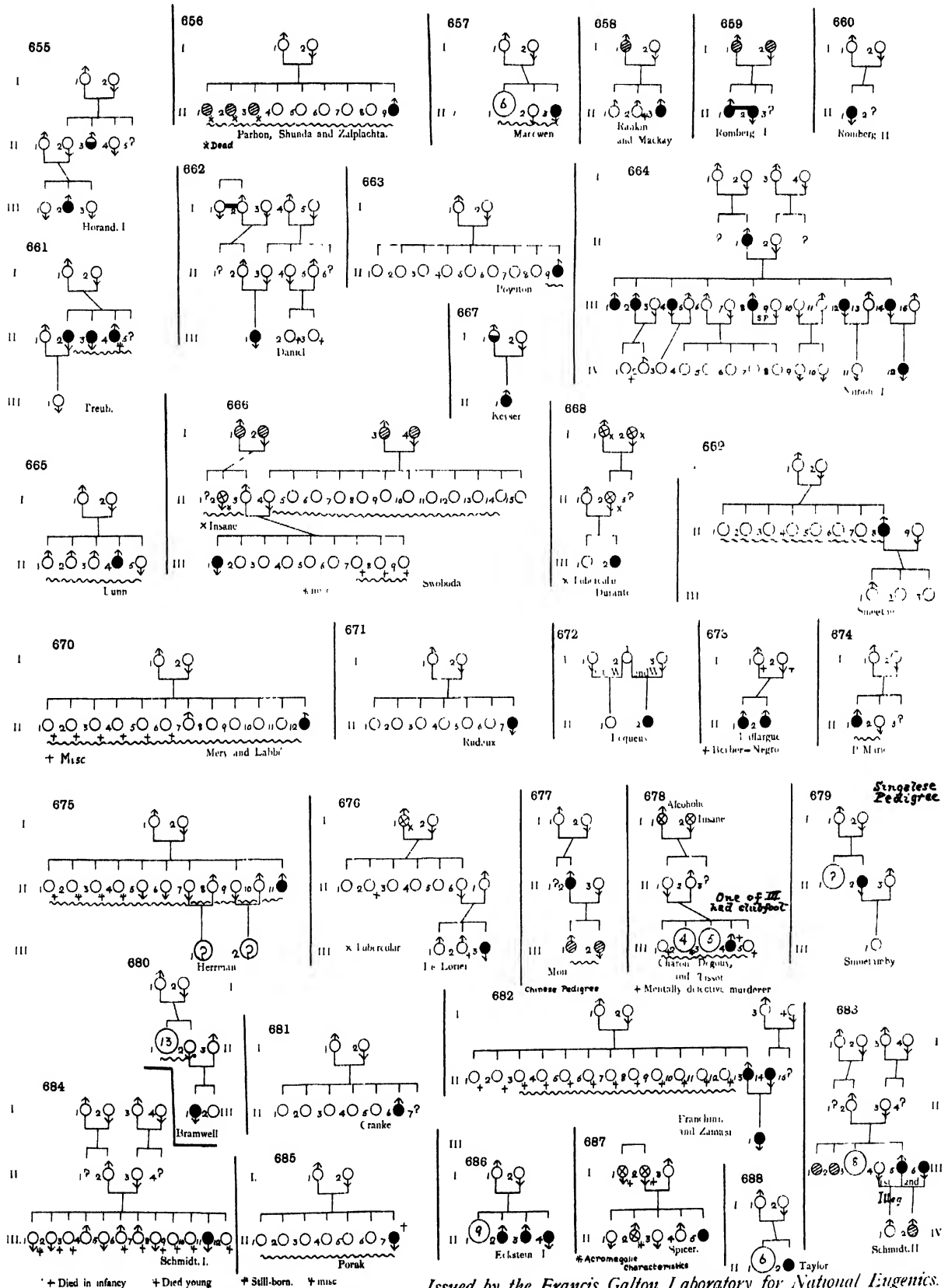
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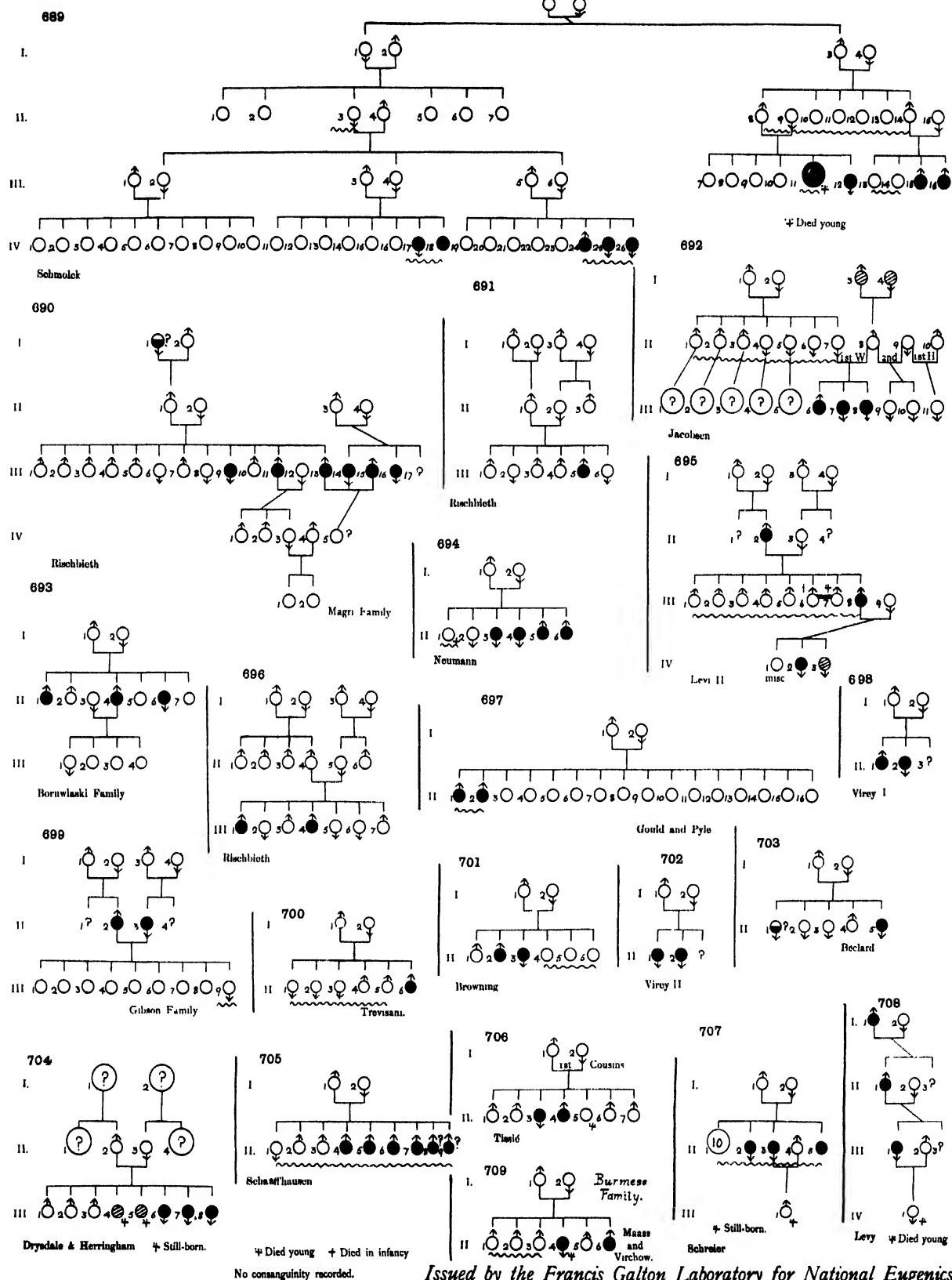
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- P—, B. 618. P—, Pierre, B. 417, 442, 443, F. 623. Paap, Simon, B. 53, 69^b, 118^b, Ic. 86, 156, 167^a, F. 715, Pl. RR (97). Pepin, le Bref, p. 359. Pereira, Don Jozé Cordero, B. 53. Pertuseno, Nicolasio, p. 359, Ic. 56, Pl. VV (116). Petersen, Sophie, B. 270, F. 684. Phatama, B. 323, F. 709. Philatas of Cos, p. 358. Philips, Calvin, B. 138, F. 710. Piacenza, Anna, B. 235, F. 617. Piccolomini, Admiral, B. 129. "Pierre le Grand," B. 416^b. Pinson, Louis ("Balthazar"), p. 359, B. 205. Podi, Nona, B. 504, F. 679. Pope, p. 360. Pospiech, Adolf, p. 406. Pospoel, Caterina, B. 248, F. 746. Pouce, Tom, pp. 362, 370. "Prince Mignon," Pl. WW (118). "Prince of Orange," B. 23^b. Prinz, Josefa, Rudolf and Ulrich, B. 538, F. 689, Pl. BB (44, 45).
- R—, Eugénie, B. 498. "Ragazza gigantesca," B. 14^b, Ic. 64^a, 64^b, Pl. TT (104). Radho, B. 629, Pl. LL (77, 78^a). Ralph, Elizabeth, B. 74. Reisberger, Margaretha, B. 270, F. 788. Richebourg, p. 361. Ritchie, David ("The Black Dwarf"), B. 115. Robin, Ic. 182^b. Romondo, George, B. 53, Ic. 156^a, Pl. KK (73). Rose, Peter, B. 270, F. 830. Rossow, Franz and Karl, B. 332, F. 697, Pl. AA (43). Rouse, Anne, B. 18^b, Ic. 188.

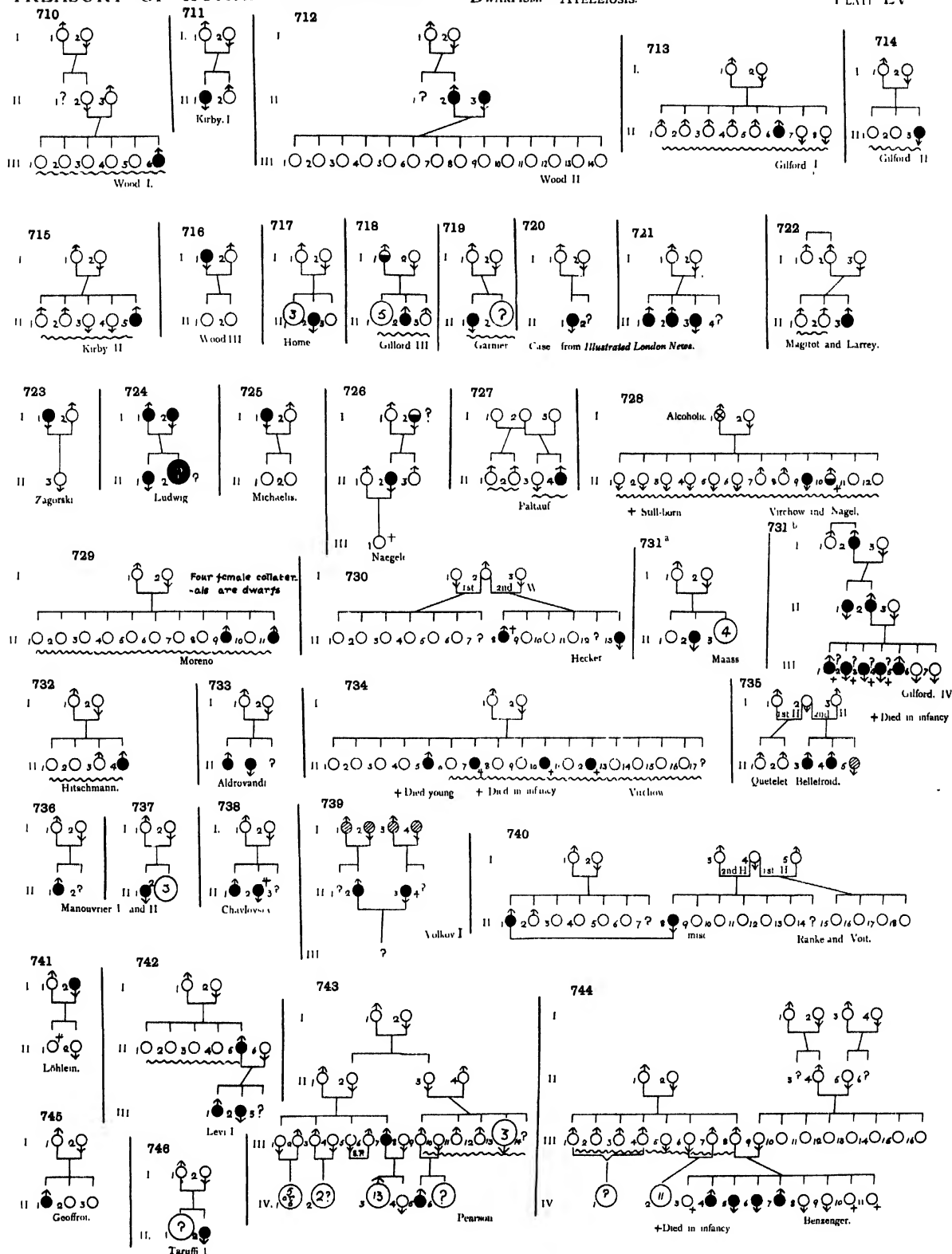
¹ A most excellent reproduction of Knoumhotpu has just been published by M. A. Ruffer in his paper on "Dwarfs and other Deformed Persons in Ancient Egypt," *Bulletin de la Société Archéologique d'Alexandrie*, No. 13, 1911.

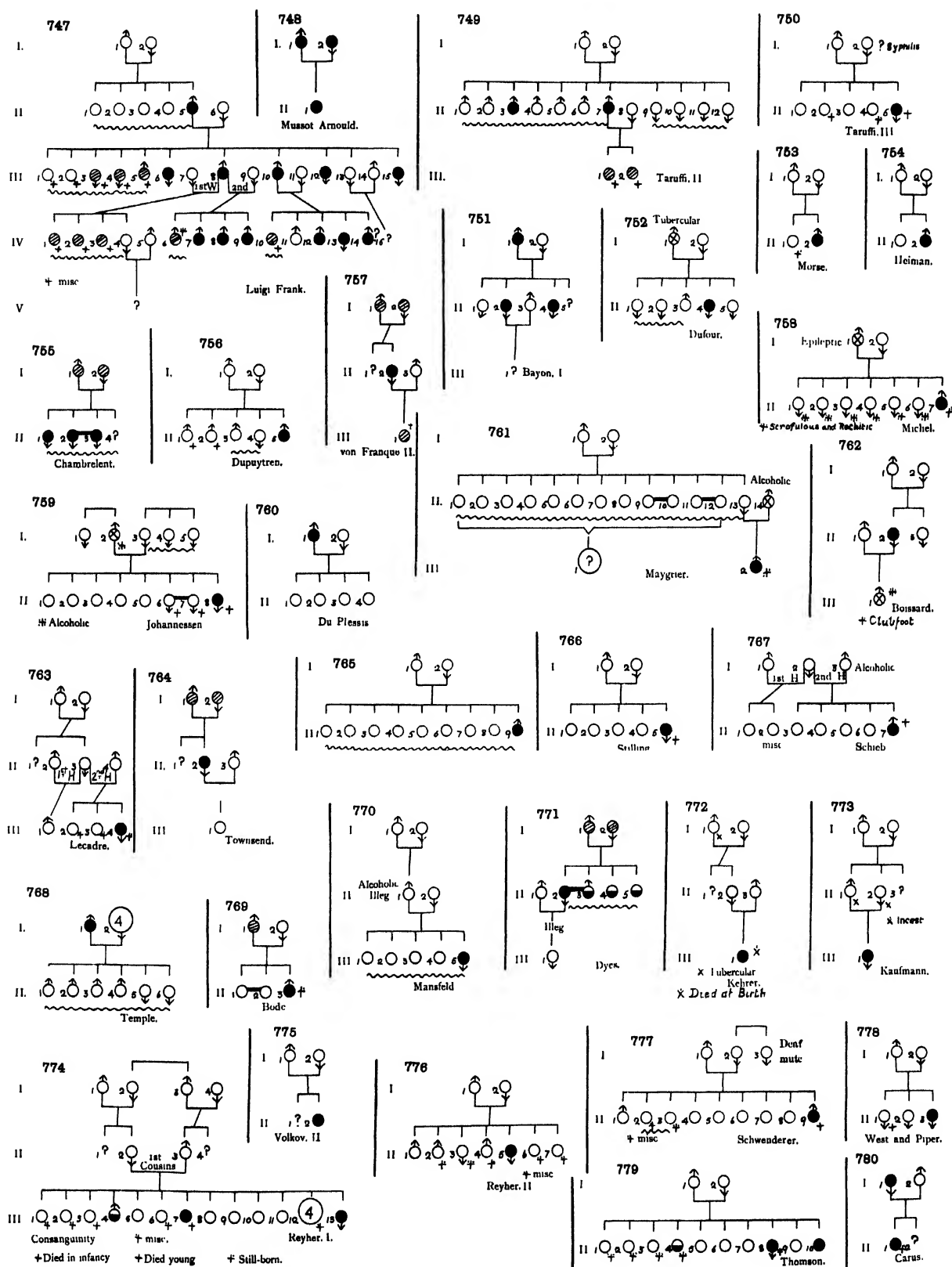


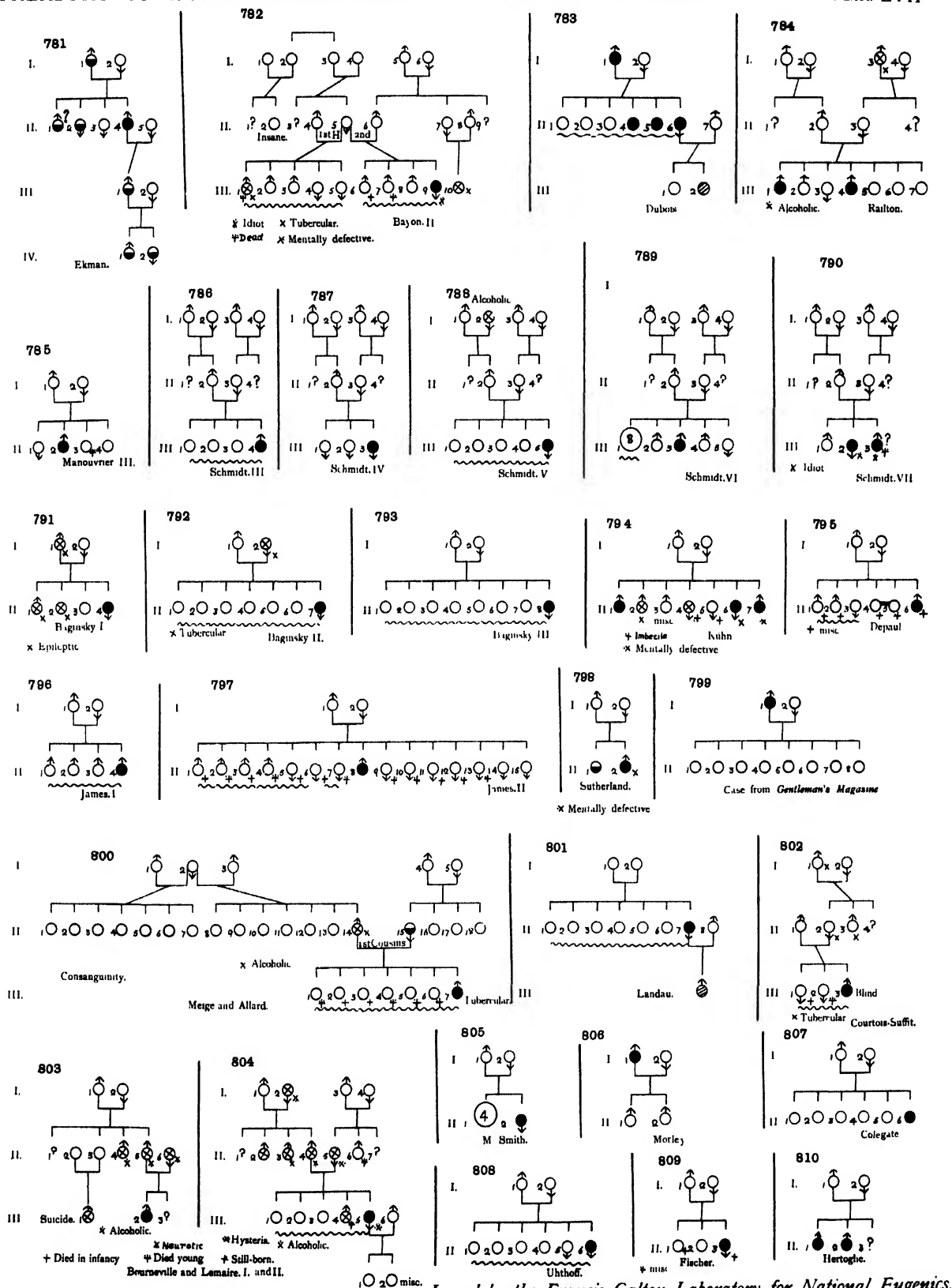


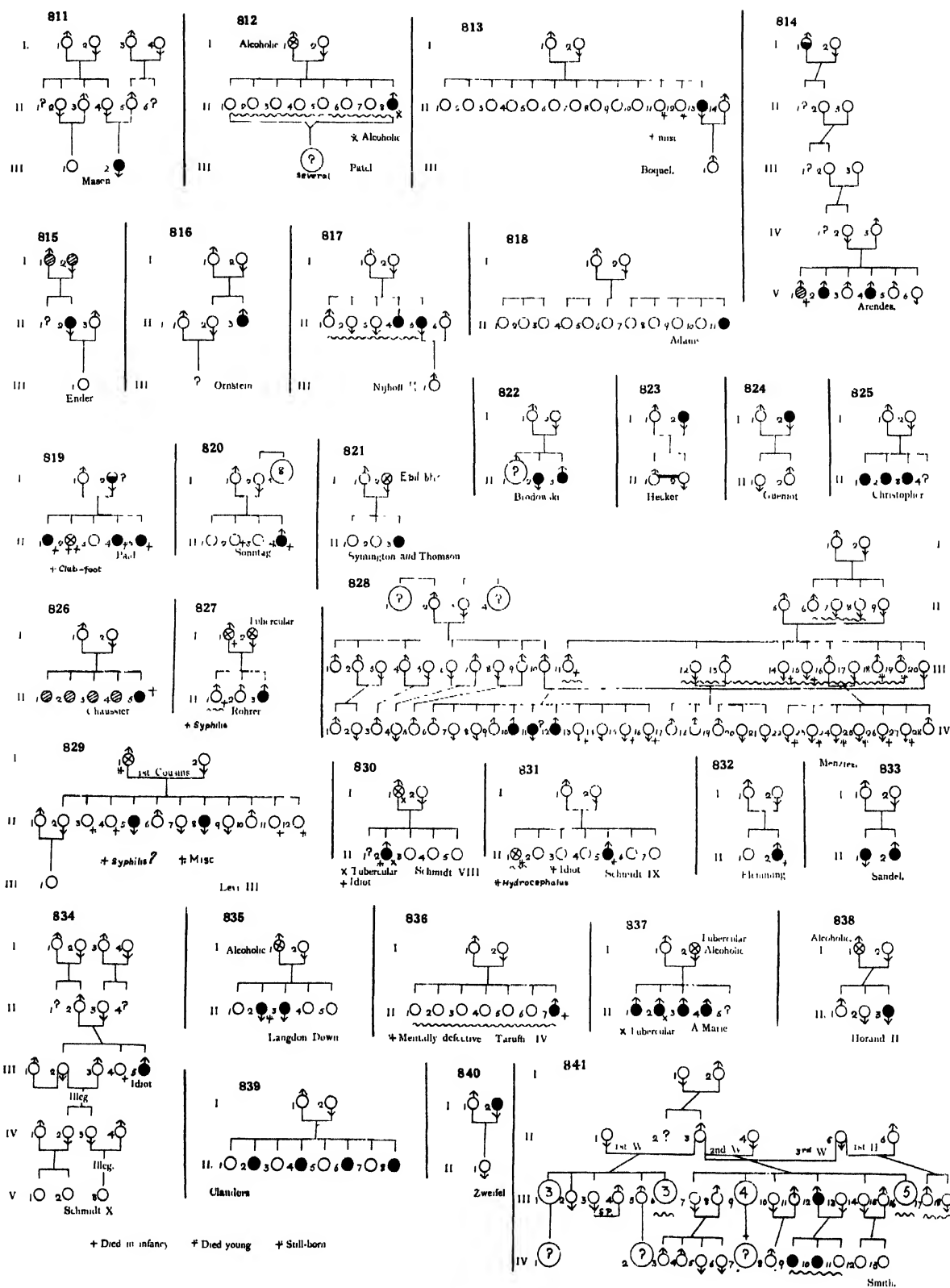












- S—, Maud, F. 609. Sauer, Alois, p. 406. Schreier, Babet (Anna Barbara Schreyer), B. 60, 62, 63, F. 703. Schumann, Maria, B. 462. Schwarz, Martha, p. 406. Scofield, Edward, Ic. 171^a. Shepherd, Anne (Mrs Gibson), pp. 360, 404, B. 97, 224, Ic. 50, 66, 127, 177, 185. Sicard, B. 386, 492, F. 612. Singh, Hamel, B. 629, Pl. LL (77—78^d). Singh, Sewa, B. 629, F. 797, Pl. LL (77—78^c). Singh, Wazir, B. 629, Pl. LL (77—78^e). Sisyphus, pp. 355, 358. Skinner, Judith, p. 361, B. 138, 332, Ic. 170, F. 712. Skinner, Robert, p. 361, B. 138, 332, Ic. 170, F. 712. Smith, B. 53. Souvray (Barbe and Anne Thérèse), B. 64, Ic. 140, 141, F. 702, Pl. II (70). Still, Victor, B. 368. Stöberin, Catherine Helena, B. 37, 49, 50, 93, Ic. 138, F. 724. Stocker, Nannette, p. 361, B. 53, Ic. 154, F. 711, Pl. II (69). Stratton, Charles ("General Tom Thumb"), pp. 361, 395, B. 224, 240, Ic. 88, 168, F. 735, Pl. AA (43) and Pl. WW (120). Struss, B. 270, F. 735, 790.
- T—, A., Pl. OO (87) and (88). Tarr, John, p. 363, Ic. 173. Teresia ("The Corsican Fairy"), B. 69^b, 167^b. "Tom Thumb" (see Charles Stratton). "Tom Thumb, Junior," Mr and Mrs, Pl. EE (55). Toselli, Antonio, B. 86, F. 700. Trout, George, p. 363, Ic. 176. Tschuschke, Helene (Kulawy) and Reinhold, p. 406, Pl. EE (56). Tuailon, Auguste, B. 313, 324, F. 736. Turol, Ic. 89.
- Uehlein, Charlotte, B. 300^b. Ulpts, Diedrich, p. 406. Ulpts, Ludwig, Pl. DD (51) and Pl. FF (62).
- Valakoff, p. 359.
- W— (Mrs J. F.), B. 254, F. 621. W—, Lili, F. 611, Pl. Q (10). Walpole, Lydia, B. 79. Ward, Don, pp. 375, 406, Pl. Q (6—8). Warren, Lavinia, p. 361, B. 224, Pl. AA (43) and Pl. WW (120). Warren, Minnie, Pl. AA (43) and Pl. WW (117). Warton, Hannah, B. 18^b. Warton, Lilly, p. 406. Wassilievitch, B. 198, Pl. KK (76). Weisseneder, Josef, p. 406. Welsing, B. 270, F. 786. Weston, Hannah, Ic. 191. Whitelamb, Keham, B. 118^b, Ic. 172. Whitson, Andrew, p. 363, Ic. 174. Willkowsky, Wilhelm, B. 270, F. 789. Wladislaus ("Cubitalis," "Lokietek"), pp. 359, 370, B. 98. Wormberg, John, B. 18^b, 55, Ic. 130, 131, 132, 133, 153, 189. Wruck, Andreas, p. 406.
- Zacchaeus, B. 11^b. Zadek, Aboo, B. 37, F. 768. Zarate, Lucia, B. 205, F. 719. Zimmermann, Balthazar, pp. 362, 370, B. 187, 232, F. 765, Pl. JJ (71^a).

This index lays no claim to completeness. Almost monthly we receive notices of new cases of ateleiotic dwarfism. Many of these cases are known by "show" names, and, apparently for commercial purposes, great reticence is maintained as to family history and locus of origin. Thus it is not always possible to ascertain whether a "new" dwarf is really an old friend under a novel name. Still this index may be of some service to the future student of heredity endeavouring to link up the dwarfs of his day with those of the past.

DESCRIPTION OF PLATES¹.A. Ethnic Dwarfism².

PLATE O (1). Akkas as representatives of ethnic dwarfism. The only peculiarities these show are those of race. They are normally proportioned. Average stature 3' 6" to 4'. These dwarfs are shown here in contrast to those whose dwarf growth is due to disease. By kind permission of Sir Benjamin Stone.

The reader should also compare Plate VV (107).

B. Dwarf Growth of Pathological Origin: Achondroplasia.

PLATE P (2). Twins, aged 15 months. By kind permission of Dr Robert Hutchison. Male normal, a well grown child; but for left internal strabismus (a condition which the father also shows) he shows no peculiarity. Female achondroplastic. Note the large head (the maximum circumference of the head in these two children is equal). Trunk of about the same length as in the male child; measurement from episternal notch to upper border of symphysis pubis is as nearly as possible equal in the two, though a little the greater in the male. All extremities in the female are markedly shortened (micromelia). This affects the proximal segment more than the intermediate, i.e. arm and thigh are shorter than forearm and leg respectively, whereas in the normal they are longer; thus the micromelia is of rhizomelic as opposed to mesomelic type. The hands are short, broad and thick; the fingers are of nearly equal length and show the "trident hand" deformity ("main en trident"). The feet are also typical. But neither hands nor feet are properly shown here. All the long bones are slightly curved, convexity externally, and the epiphyses are somewhat enlarged. The abdomen is prominent. She has a rickety lumbar kyphosis (not shown here), but no "beauling" of ribs, "rosary" or other evidence of rickets. The head shows the following features: prominence of frontal and parietal eminences, depression of the bridge of the nose, which is tip-tilted, with wide nostrils. The face relatively to the size of the cranium is small and somewhat narrow, the malar bones being small. The general contour of the face is thus somewhat like an inverted pear, while that of the normal child is oval. This is a common feature in achondroplasia, though shown more markedly in some other conditions, e.g. hydrocephalus. All normal skin folds exaggerated. Not a fat child, little increase of subcutaneous tissues (unusual features in achondroplasia). Intelligence normal. Beginning to walk and talk. Mesial and lateral incisor teeth in upper jaws and mesial incisors in lower ones present. See Fig. 609.

(3). L. D., whose pedigree is shown in Fig. 610. An achondroplastic girl aged 7 years and her sister aged 5 years, of normal proportions and average growth for age to show contrast of growth with the normal. The length of the trunk measured from episternal notch to upper border of symphysis pubis is equal in these two cases. The circumference of the cranium is half an inch greater in the achondroplastic child than in the normal one. The distance between the vertex of the skull and the upper border of symphysis pubis is equal in the two cases. The mid-point between the vertex and the soles of the feet, which in the normal adult lies just at the upper border of the symphysis pubis, is situated in the normal child above this point, about one-third of the distance upwards between the upper border of symphysis and the umbilicus. This represents the normal proportions of limb length to stature in infancy and early childhood and is shown in "true dwarfism," see Plate EE (57). In the achondroplastic child the mid-point lies about midway between the umbilicus and the distal extremity of the xiphi-sternum. The lower extremities are thus markedly shortened (micromelia). The upper extremities are also markedly shortened (micromelia); whereas in the normal child the finger tips extend to the middle third of the thigh, in the achondroplastic they only extend to a point midway between the iliac crest and the great trochanter of the femur. This shortening affects the proximal segments of the limbs more than the intermediate segments, i.e. it is of rhizomelic type. In the upper extremity of the normal child the arm, measured from the acromial angle of the scapula to external epicondyle of humerus, is longer than the forearm measured from external epicondyle to tip of styloid process of radius by $\frac{1}{16}$ of the length of the former. In the lower extremity the thigh, measured from the antero-superior spine of the ilium to the lower border of internal condyle of the femur, is longer than the leg, measured from the upper border of internal tuberosity of the tibia to the tip of the internal malleolus of the latter by $\frac{2}{11}$ of the length of the former. In the achondroplastic child, these segments, measured from the above points, show that the femora are a shade

¹ All rights of reproduction from these plates are strictly reserved. The copyright of some photographs belongs to the Laboratory. Others are reproduced by special permission extending only to this publication.

² A study of eleven pigmy crania found in ancient Egyptian cemeteries has recently been made by H. Dorothy Smith: see *Biometrika*, Vol. VIII. p. 262, with full scale photographs.

shorter than the tibiae. The limbs have a thick-set, massive appearance. The arms are held with elbows abducted from the sides and not, as in the normal, at the sides. This, as is shown by radiograms, is partly due to the large size of the heads of the humeri, partly to curvature of bones. It is probably due also, in part, to intervention of muscular masses. All the long bones of the limbs are somewhat curved; this, however, owing to thickness of muscles, can only be seen in the case of the tibiae. It takes the form of slight angular curvatures in the region of junction of epiphyses and diaphyses and does not affect the shafts, as in rickety curvature. All the epiphyses of the extremities as revealed by palpation of the long bones are somewhat enlarged, but the bones of the thorax are apparently normal, with the exception of the sternum, which is bowed with convexity forwards. There is no "rosary" or "beading of ribs." All the normal skin folds are exaggerated and the subcutaneous tissues increased. The normal child has a commencing mid-dorsal scoliosis of adolescence, convex to L., which makes the R. shoulder lower than the L. as she stands.

(4). The achondroplastic child aged 7 years shown in (3). Note, in addition to features already described, the large size of the head, with prominent frontal and parietal eminences. The bridge of the nose is depressed and it is tip-tilted. The buttocks are prominent; there is apparent lordosis. The abdomen is very prominent. Note here the massive appearance of the limbs, the large, broad and thick feet and hands and the peculiar shape of the latter. The sternum is somewhat bowed, with convexity forwards. There is an appearance of obesity owing to the increase of subcutaneous tissues. Intelligence normal. Compare with Plate V (19) and (22).

(5). The hands of achondroplasia contrasted with normal hands; they are those of the cases shown in (3). Note that the achondroplastic hands are very short, and are broad and thick. The fingers are relatively short and thick. They are more nearly equal in length than the normal. In complete extension the distal extremities of the digits (or finger-tips) cannot be approximated but diverge or radiate like the spokes of a wheel. This constitutes the "trident hand" or "main en trident" of Pierre Maric. Compare with Plate Q (6), Plate R (11), Plate U (19), and Plate V (27). The fingers show another peculiarity when compared with the normal in that the three segments of each of the digits form, as it were, three separate superimposed cylinders of progressive diminution in diameter. This appearance has also been described as that of a truncated cone. Contrast this with the gradual tapering of the normal fingers. The subcutaneous tissues are increased and all normal skin folds are exaggerated. Photographs (3) to (5) are due to the kindness of Dr Robert Hutchison.

PLATE Q (6)—(8). D. W., aged 28 years. Height 4' 1". Acrobat. An achondroplastic male adult. Note shortening of all four extremities in comparison with size of the head and trunk. The mid-point between the vertex and the soles of the feet falls half an inch above the umbilicus, instead of, as in the normal, at the upper border of symphysis pubis. The lower extremities are thus much shortened, and their length, if proportions were normal, would correspond to a total height of just over 3', instead of, as here, to 4' 1". The head and trunk, showing normal proportions to one another, would correspond to a height of just over 5', if the proportions in length of the lower extremities to trunk and head were normal. The upper extremities are markedly shortened; the finger tips extend only as far as the great trochanters of the femora, instead of to the middle third of the thighs. This micromelia of all four extremities is of rhizomelic type, affecting the humeri and femora more than the bones of the forearm and leg. Thus the measurements are: R. humerus 5" (acromial angle to external epicondyle), R. radius 6" (external epicondyle to styloid process), R. femur 8" (antero-superior iliac spine to internal condyle), R. tibia 9" (internal tuberosity of tibia, i.e. the line of the knee joint, to internal malleolus). The radio-humeral index, i.e. (length of radius)/(length of humerus) $\times 100$ is 120; the tibio-femoral index, obtained in the same way, is 112.5. In normal European adults¹ the first varies between 82 and 88, and the second between 84 and 90 (Porak). In achondroplasia the radio-humeral index may be as low as 66, 58 or even 53; the tibio-femoral as low as 78 or even 64 (Regnault). In Porak's *Maternité* skeleton they were 86 and 85. Compare (5), Plate R (13). Length of foot 8", i.e. equal to that of the femur. The long bones of the extremities show no curvatures that can be made out on palpation. The arms are held with elbows abducted from the sides. Note the massive musculature of the limbs, prominent buttocks, straight or flat back, but nevertheless an appearance of lordosis, and, though this individual is not corpulent, the prominence of the abdomen. The hands, which are typical as well as the feet, are relatively short, broad and thick. The head is large and brachycephalic; the frontal and parietal eminences are prominent. The bridge of the nose is depressed, its extremity *retroussé*, the nostrils are large and broad. The measurement from nasion to inion is very short. Compare with other cases of achondroplasia and contrast with the "true" dwarfs. There is a slight degree of prognathism. The face relatively to the cranium, which overshadows it, is small and narrow, but does not show the "inverted pear" contour so clearly as in some other cases. Intelligence good. Reads and writes as well as can be expected of any individual of his profession. Genital organs normal, secondary sex characteristics present. Compare with Plate R (11—13), which shows achondroplastic modification of head in the brachycephalic Mongolian skull; and with Plates S (14, P), U (18) and (19), V (29).

¹ [This statement appears to be incorrect: see my footnote p. 378. Editor.]

(9). Elizabeth Dörffler, *née* Kipke, aged 42 years, whose pedigree is given in Figs. 608 and 620. With her is her daughter, aged 17 years. On Plate FF (62) is shown her elder sister, aged 43, with her ateleiotic husband and son, aged 18. All three women are typically achondroplastic. Cf. Boeckh's Case, Plate S (14, F., F.).

(10). Lili W——, aged 28 years, whose pedigree is given in Fig. 11, a typical achondroplastic adult female.

PLATE R (11)—(13). A Chinaman, aged 58 years. Height 3' 6 $\frac{3}{4}$ ". Marked micromelia of all four extremities. This, however, is not rhizomelic, as is usual in achondroplasia, but the normal proportional length of segments is preserved, at least in the lower extremities. The finger tips extend just beyond the crests of the ilia, but do not reach the great trochanters. The mid-point between vertex and soles of the feet is 2 $\frac{3}{4}$ " above the umbilicus (which is 19" from the ground) instead of, as in the normal adult, at the upper border of symphysis pubis. The head is large, relatively and absolutely, circumference 22 $\frac{1}{4}$ ". Mastoid to mastoid 7". The frontal and parietal eminences, though not very prominent, are much more so than is seen in the normal brachycephalic or mesaticephalic Mongolian skull. For a Mongol, in whom in the normal the malar bones are very prominent and the face therefore very broad and flat, the face is very narrow and small in comparison with the cranium. That is the features of achondroplasia as shown in the European are here somewhat modified in the Mongolian skull. The bridge of the nose is depressed; it is "tip-tilted" and with wide nostrils. The trunk is relatively long and shows no peculiarities. Chest expanded measures 27". The radius is 2 $\frac{3}{4}$ " in length. The ulna, from extremity of olecranon process to ulnar styloid process is 5" in length (difference of radius and ulnar seems excessive). In the lower extremities the thigh, measured from antero-superior iliac spine to internal condyle of femur, is of 9 $\frac{1}{2}$ " length; the leg, measured from internal condyle of femur to internal malleolus of tibia, is of 8" length. Radio-humeral index cannot be stated, since the measurement of the humerus is not given. Tibio-femoral index, *i.e.* (length of tibia)/(length of femur) \times 100 = 84.2. Contrast with Plate Q (6)—(8) and compare with Plate U (18). The shortening of the lower extremities is thus not rhizomelic but the normal proportion in relative length of segments is preserved. (Compare with skeleton Plate U (18) in which this is also shown. Contrast with (3), (8), (14), (17) and (19), in which the usual rhizomelic shortening or micromelia of achondroplasia is shown.) The arms are held with elbows abducted from the side. This is, however, not so marked a feature in this case as in some others. It occurs in all individuals of great muscular development. The hands show the typical deformity of achondroplasia very well indeed. They are short, broad and thick. The fingers are of nearly equal length and show the "trident hand" deformity. The digits have the peculiar shape characteristic of the condition. This has been considered by some to be like a truncated cone, by others like a series of three cylinders of progressive diminution in diameter superimposed. Compare (5), (19) and (27). Note the marked muscularity of this individual. He is intelligent, bright and alert; speaks English slightly, and earns his living by dancing and buffoonery. A native of Hankow, 500 miles up the river Yang-tse-kiang. Discovered by Dr Gordon Moir, R.N., whose case he is, at Shanghai¹.

PLATE S (14). Cases of achondroplasia, referred to in the Bibliography and Pedigrees. F., F.: Boeckh's Case. See Fig. 620 and Bibl. No. 280. G.: Joachimsthal's Case. See Bibl. No. 363, S. 288. H., H': Charpentier's Case. See Bibl. 247, p. 25. I., J.: Porak's Case. See Bibl. 247, p. 21, and Fig. 650. K.: Joachimsthal's Case. See Bibl. No. 363. L., M.: Thomson's Cases. See Bibl. No. 281. N.: Baldwin's Case. See Bibl. No. 254 and Fig. 621. O., O': P. Marie's Case (Claudius). See Bibl. No. 371 and Fig. 674. P.: P. Marie's Case (Anatole). See Bibl. No. 371. Note the appearance of obesity in all three women and the muscularity of the men. These are characteristic features as regards the two sexes. The two children G. and K. are rather thin, an unusual type of the disease.

(15). Shows: (a) An achondroplastic fetus, Q., R. Note the large head with depressed bridge of nose; the short massive limbs, somewhat curved; exaggeration of all normal skin folds; prominent abdomen. (b) The shortening of the long bones of the extremities, S. (c) An achondroplastic upper extremity, T. Statuettes: (d) The Egyptian gods Ptah-Sokar, U., and Bes, V., showing achondroplastic proportions. (e) The Roman Emperor Caracalla, X, in caricature, with achondroplastic proportions, thus proving that the condition was well known to the Egyptians and the Romans. See Plate UU.

PLATE T (16) and (17). Bones of the extremities of an achondroplastic child at birth (17), compared with those of a normal child at birth (16). (Note: The former is a wet specimen, the latter a dry one.

¹ Another instance of typical achondroplasia in a Chinaman named Li is described by Dr Molodenkoff in the *Nouvelle Iconographie de la Salpêtrière* for June 1910. Aged 33 years. Height 115 cm. A photograph shows that he presents the same features, as regards the shape of the head, as the above case. Thus the frontal and parietal eminences, though not so prominent as in the skulls of most cases of achondroplasia occurring in Europeans, are more so than is usual in the normal brachycephalic or mesaticephalic Mongolian skull. The face also is relatively narrow, the malar bones being very little prominent. The bridge of the nose is relatively depressed. It is tip-tilted and with wide nostrils. In the same number a Roumanian case is described by Dr Zosin. His head presents the features shown in any of the other European cases figured here, *i.e.* the skull is brachycephalic; the frontal and parietal eminences are very prominent; the bridge of the nose is greatly depressed, its tip upturned and the occiput is vertical.

The relative thickness of the former is therefore somewhat exaggerated, while, owing to dryness and shrivelling, the latter appears unduly thin. This especially applies to the hands and feet. Therefore only the comparative *length* of segments of each can be considered.) In the achondroplastic limb all the long bones are short and very thick. They all show abnormal curvatures, such as are described in the text; these are juxta-epiphysial for the most part, and in some bones there are more than one. In the radius and humerus there are two curvatures occurring in opposite directions, an S or Z shape, somewhat like that of a clavicle, being produced. This is a common feature of achondroplastic foetal bones and differs markedly from the C curves, all in the same direction, of rickety bones; a condition of double curvature similar to that shown in humerus and radius can just be made out in the femur. All the epiphyses are greatly enlarged. Section through the epiphysial line, such as that of the lower end of the femur here depicted, shows a band of fibrous tissue, or, it may be, membrane, continuous with the perichondrium and periosteum, interposed between the epiphysis and diaphysis for a considerable distance. This condition is characteristic of achondroplasia and occurs in no other known condition. The nature of this band is discussed in the text, pp. 379—81. The tibio-fibular interosseous space is increased owing to bowing of the fibula outwards. The radio-ulnar joints show partial dislocations. The sacrum articulates with the ilium in a plane which is more nearly horizontal than normal, the upper end of the sacrum being displaced downwards and forwards and its lower end upwards and backwards. The clavicle is not shortened. The hands and feet are relatively very large (the foot is longer than the femur). The fingers are nearly equal in length; the third and fourth show the deformity "en trident." The clavicle and foot are longer in the achondroplastic than in the normal specimen, so that, apart from shortness of limb, the former was doubtless the bigger child of the two.

Actual Measurements:—

Lengths of:	Normal bones	Achondroplastic bones
Clavicle	$1\frac{5}{12}$ inches	$1\frac{7}{12}$ inches
Humerus	$2\frac{7}{12}$ "	$1\frac{2}{3}$ "
Radius	2 "	$1\frac{1}{6}$ "
Femur	3 "	$1\frac{1}{12}$ "
Tibia	$2\frac{1}{3}$ "	$1\frac{1}{4}$ "
Foot	$1\frac{5}{8}$ "	$2\frac{7}{12}$ "

(a) Radio-humeral index. Normal = 77·4; achondroplastic = 70·0.

(b) Tibio-femoral index. Normal = 77·7; achondroplastic = 65·2. See the remarks under Plate Q (6—8) [and the footnote, p. 555]. Thus, though it is usual for the femur and humerus to be more shortened than the tibia and radius, at least in the adult achondroplastic, this is not invariable; and it is not the case in the foetal limbs here shown, nor in (11)—(13) nor (18)¹.

PLATE U (18). Skeleton of an achondroplastic adult. Note the marked shortening of all four extremities, relatively to the trunk and head (micromelia). In the normally proportioned adult the mid-point between the vertex of the skull and the soles of the feet lies at the upper border of the symphysis pubis; in this case, however, this mid-point lies at the middle of the body of the first lumbar vertebra. There is thus marked shortening of the lower extremities. In the normal adult the finger tips extend to the middle third of the thigh; in this case, however, they reach no further than the great trochanters of the femora. The upper extremities are thus markedly shortened also. The shortening involves the intermediate segment of the limb as much as the proximal, *i.e.* the shortening is not rhizomelic. This is not usual in achondroplasia but has been observed in several cases. See account of (16)—(17). The hands and feet (distal segment of the limb) are, comparatively, much less affected than the other segments and are relatively very large. This is the rule in achondroplasia. The bones of the pelvis and the scapulae are very small. The clavicles are nearly as long as the humeri. The upper end of the sacrum is tilted downwards and forwards and the promontory thus projects markedly forwards. The plane of the sacrum is thus more nearly horizontal than normal. The skull is large, relatively to total height it is very large; it is brachycephalic; the parietal eminences are very marked but the frontal eminences are not specially so. Bridge of nose not much depressed. Dentition normal. The vertebral bodies are very broad and

¹ [I doubt whether it is the general rule in achondroplasia, especially when the measurements are made on the skeleton, that the femur and humerus are shorter than the tibia and radius respectively. At least the measurements in this work show very many exceptions. The femur and humerus may have a greater percentage reduction on the normal than the tibia and radius without necessarily becoming absolutely shorter than the latter, and it might be well to interpret the term rhizomelic in this more restricted and guarded sense. EDITOR.]

thick. The ribs are very thick and strong and show excessive groovings and markings for muscular origins and insertions. The sternum is very broad, thick and strong. All the long bones of the extremities are exceedingly thick and strong, and show excessive markings for muscular attachments. Their ends, corresponding to old epiphyses, are relatively enormous. This is especially well shown, about the knees, in the condyles of the femora and the tibial tuberosities, at the upper extremities of the humeri, the heads and tuberosities of which are relatively enormous. The site of insertion of the deltoid muscle is exceedingly prominent. The neck of the femur is very short and forms an angle with the shaft which constitutes the condition of coxa vara, though of slight degree. The trochanters are enormous. The upper extremities of the fibulae enter into the articulations of the knee joints, as is the rule in achondroplasia. The lower extremities of the fibulae forming the external malleoli of the ankle joints extend abnormally far beyond the internal malleoli. The interosseous spaces of the legs and forearms are much increased in size. The bones of the forearms and arms show some degree of curvature, but this is less than is frequently seen in achondroplasia. The bones of the legs show very little curvature and such as there is occurs at the union of epiphyses and diaphyses and not in the shaft itself. Compare with bones of new-born infant shown in (17), with adults (6)—(8) and (11)—(13), and with radiogram (19). Radio-humeral index = 83.3. Tibio-femoral index = 70.0. (Measurements taken from the following points: Head of humerus to external epicondyle. Head of radius to extremity of styloid process of radius. Head of femur and great trochanter to margin of articular surface of internal condyle. Articular surface of internal tuberosity of tibia to extremity of internal malleolus of ankle joint.)

(19). Radiograms of skeletons of a normal female child, aged 9 years, and of an achondroplastic girl of the same age. Note the trunk is as nearly as possible of the same length in each. The head is nearly the same size in each. Measurement from vertex to upper border of symphysis pubis is approximately equal in each. All four extremities are shortened in the achondroplastic child. In the normal child the femora and humeri are much longer than the bones of the leg and forearm respectively. In the achondroplastic child the bones of the arm and forearm, thigh and leg are respectively as nearly as possible of equal length. The bones of the extremities in the latter are considerably thicker than in the former and in some instances the sites of muscular insertion can be seen to be hypertrophied (*e.g.* that for the deltoid); all their epiphyses are much enlarged. The hands show the "trident" deformity, the fingers diverging in extension and radiating like the spokes of a wheel. The bones of the feet are short and thick. The cranium shows prominence of the frontal eminence, it is high vaulted and platybasic, with a vertical occiput; the bridge of the nose is depressed and the upper part of the face is in retreat beneath the forehead; there is a slight degree of prognathism; the distance between the cervical spine and the pterygoid processes is, however, reduced in the case of the achondroplastic skull. Compare with this: (3), (4), (5), (6—8), (11—13), and (22).

(20). *Pseudo-achondroplastic-ricketsy foetus* (Véron's Case, see Bibl. No. 510). Curvature of the bones of the legs. Fractures of R. humerus, L. radius, and both femora (a part of the latter has been removed for histological examination). Thinness of bones of forearm. In the lower extremities, as in the achondroplastic, supplementary transverse folds of skin can be seen at the sites of curvatures and of fractures.

(21). *Normal foetus.*

(22). *Achondroplastic foetus.* Porak and Durante's Case. Extreme shortening of the long bones of the extremities which, nevertheless, are almost as thick as the corresponding bones of the normal infant. The epiphyses, which are very large and which form the greatest part of the bones, are not visible, as they are as yet unossified, but occupy the spaces seen between the bony extremities. Sigmoid deformity of radius very marked on right side.

(23). *Normal chondral ossification.* (a) Zone of proliferation of cartilage cells; (b) zone of columns of cartilage cells; (c) line of ossification; (d) marrow and bony trabeculae.

(24). *Achondroplasia. Longitudinal section of the upper epiphysis of the femur.* (a) Zone of indifferent cartilage; (f, f') band of fibrous tissue separating the indifferent cartilage and the zone of the columns of cartilage cells; (g) vascular loop making communication between the vessels of the fibrous band and those of the bone marrow; (s) zone of columns of cartilage cells. The columnar arrangement is completely lacking and is replaced by a fibro-cartilage sown with cartilage cells, sparse and scattered without order. The inferior border of this zone is calcified in places (c) in the neighbourhood of the line of ossification, which is irregular; (o) bony trabeculae, large and well calcified without cartilaginous debris; (m) medullary spaces.

(25). *Congenital rickets (pseudo-achondroplastic).* (a) Zone of proliferation of cartilage cells; (b) zone of columns of cartilage cells, very clearly shown. The cellular columns, perfectly regularly disposed, are separated by a hyaline interstitial substance (matrix) which is more abundant than normal; (c) line of ossification beneath which are prolonged the persistent cartilaginous trabeculae (d); these, mixed with the bony trabeculae, constitute the bony layer.

(26). *Periosteal dysplasia*. (b) Zone of columns of cartilage cells very marked, longer and more regular than normal; (c) line of ossification produced by the individual opening of each of the cartilaginous columns into the medullary spaces; (d) bone marrow with large medullary spaces and narrow bony trabeculae well calcified.

(*Nouvelle Iconographie de la Salpêtrière*, 1905, pp. 502—503, Plate LIV, Porak et Durante.)

PLATE V (27). Radiograms of achondroplastic hand. Note the hand is short and relatively broad. There is marked shortening of the metacarpal bones and phalanges of the middle digit so that this is hardly longer than the index. The ring digit is even more shortened and is no longer than the little digit—the metacarpal bone is the one chiefly affected in these two digits. The fingers are thus of nearly equal length, but the shortening has affected the middle and ring fingers more than the index and little fingers and the metacarpal bones of these more than the phalanges of the digits. The fourth metacarpal is the bone most affected. All these long bones approach more nearly to the shape of a square, rather than an oblong, than is the case in the normal; that is to say, they are shorter and relatively thicker than normal. The divergence of the fingers in extension ("trident" hand) is not very well shown in this case, only the index and middle fingers are divergent. The epiphysal ends of all these bones are enlarged. That of the radius is also enlarged. The styloid process and lower extremity of the ulna are present but are much shortened. The ulna does not extend far enough to articulate normally with the radius in the inferior radio-ulnar joint. Compare with this plate, (5) and (11—13).

(28). Radiograms of achondroplastic feet. The features are broadly the same as in the hand. The digits are of nearly equal length. Some digits are more shortened than others, e.g. the fourth, and the metatarsal bone is the one chiefly affected. The bones are relatively short and thick and have enlarged epiphysal ends. The feet do not show any divergence of digits corresponding to a "trident" hand.

(29). Radiogram of the achondroplastic skull. The cranium is very large relatively to the size of the face. The prominence of the frontal eminences, so usual in this condition, is not well shown in this particular case, and the parietal eminences cannot here be seen. The bridge of the nose is depressed and the upper part of the face is "in retreat" beneath the forehead by which it is overshadowed; there is, however (probably in consequence of this) the appearance of prognathism, i.e. the jaws appear very prominent. The measurement from nasion to inion is considerably shorter than in normal European skulls of the same cranial circumference. (Compare with (6—8) which show these features well.) The distance between the posterior border of the maxilla and the cervical spine is shorter than in the normal, owing to premature synostosis of the basi-spheroid and basi-occipital bones and cessation of growth there, with the result that the occipital condyles and the pterygoid processes are abnormally approximated. The skull is platybasic with vertical occiput. Compare this with (6—8), (14) and (19) which show many of these features.

PLATE W (30). Skeleton of achondroplastic foetus at full term, from the Royal College of Surgeons, by kind permission of Professor A. Keith. Note (1) Large head with voluminous cranium and small face. The frontal and parietal bosses are very prominent. The bridge of the nose is much depressed. The skull is platybasic and with a vertical occiput. (2) Micromelia. All four extremities equally involved. The clavicles are longer than the humeri. The radii are longer than the humeri; the tibiae are longer than the femora. (3) All the diaphyses of the long bones of the extremities are very massive and curved. The radii show double curves, forming an S or Z-like shape. The interosseous spaces of forearms and legs are much increased in size. (4) The fibula enters into the articulation of the knee joints. (5) The "main en trident" or trident hand is well shown. (6) The back is very straight, the lumbar concavity being practically absent. This skeleton was mounted without disarticulation and none of these appearances are artifacts. Owing to the size of the cranium this case was at one time regarded as hydrocephalic.

(31). Achondroplastic foetus. Note the large head, with prominent frontal and parietal eminences, vertical occiput and depressed nasal bridge; the trunk is not shortened but the extremities are markedly shortened; the segments of these are sausage-like (see p. 374); the fingers radiate like the spokes of a wheel and are all of nearly equal length. Note the peculiar conformation of segments of the digits. The feet are rather short and are broad and square and the toes are of nearly equal length. The back is straight, the buttocks and abdomen prominent. All skin folds are exaggerated. The limbs are somewhat curved, but this feature cannot be seen well.

PLATE X (32). Radiogram of achondroplastic foetus, from the Royal College of Surgeons, by kind permission of Prof. A. Keith. Note the conformation of the skull already described, the shortening of the bones of the extremities, particularly the femur and humerus, the sigmoid curvature of the radius, and the shortening of the fingers, which are of equal length. The back is straighter than the normal, the dorsal and lumbar curvatures being lacking there is on the contrary a slight lumbar kyphosis. The sacrum is tilted. Centres of ossification are lacking for the bodies of all the cervical vertebrae (except for odontoid process and for II) and for the coccyx. There are no centres of ossification for the epiphyses of any of the long bones except the head of the femur.

PLATE Y (36)—(37). An achondroplastic female child (37), aged 9 years. Typical features of achondroplasia (compare with (4)). Note shortening of extremities, characters of this as already described, peculiar hands; prominence of buttocks and abdomen and appearance of lordosis (pseudo-lordosis), shape of head, bridge of nose, etc. In contrast to this is (36), a woman, aged 42 years, showing the dwarfing of growth due to infantile myxoedema. In the former the mid-point between the vertex and soles of the feet lies midway between the umbilicus and the xiphi-sternal articulation; in the normal adult it lies at the upper border of symphysis pubis; in (37) it lies about midway between the latter and the umbilicus; this measurement represents the relative length of limbs to trunk and head of the normal infant and young child, *i.e.* in this dwarf there is practically no micromelia; the finger tips reach to the middle third of the thighs as in the normal. The segments of the limbs present the normal proportions in length to one another and there is no disturbance of this like that shown in (37). The arms are not held abducted from the sides in extension as in (37). There is no great prominence of buttocks as in (37), except such as is due to the general obesity, which is very marked, and though the abdomen is prominent this is due to the same cause. There is no lordosis as appears in (37). The frontal eminences are not prominent, the bridge of the nose not depressed. The facial expression, though not very marked, is heavy and toad-like. The condition of the hair, dry, sparse and brittle, the spade-like hands and the skin typical of myxoedema and cretinism cannot be shown in a photograph such as this.

(33)—(35). For general comparison a case of family rickets has been reproduced showing the dwarfing of growth, deformities and abnormal proportions produced by this condition. This is to be contrasted with any of the achondroplastic dwarfs shown in our plates. There is no real shortening of the long bones of the extremities, but they are curved and bent and the lower extremities appear shortened in consequence (pseudo-micromelia). As a result of the curvature of the lower extremities the hands reach abnormally far down the thighs. The bendings, curvatures and deformities are bizarre; they are the result of gravity, of the influence of the body weight upon unduly soft growing bone, brought to bear in some instances, in faulty attitudes. The curves involve the *shafts* of the long bones and are "en grand arc"; they occur in various directions. In achondroplasia, curves when present are "angular," involve the region of junction of epiphyses and diaphyses, are slight, have convexity outwards, are usually more of the nature of partial displacements of epiphyses than true curves and the shafts themselves, in all cases except that of the achondroplastic infant, are practically straight. In these figures of rickety dwarfs the arms, not having been involved in the support of body weight, are comparatively straight and have no appearance of shortening like that shown by the legs. Indeed in some cases they appear abnormally long in contrast. The shape of these heads is in no way peculiar and the bridge of the nose is not depressed in any case. Two cases show real lordosis, but in them the buttocks are not very prominent. In two the abdomen is prominent, in the elder possibly as an effect of lordosis, in the youngest it is probably merely the tumid abdomen of still active rickets. They show the deformities known surgically as coxa vara, genu varum, genu valgum, curved tibia, statcal scoliosis and cubitus varus.

C. Dwarf Growth of Pathological Origin: Ateleiosis or "true" Dwarf Growth.

Cases of ateleiosis ("nanisme vraie," "echter Zwergwuchs," or the true dwarf growth of foreign writers) fall into three groups according to the age at which the growth change commences and the particular features which, in consequence of this, they exhibit. This was shown by Hastings Gilford, to whom the whole credit for this classification of cases is due. They present three degrees. In Group I there is evidence that the change began before birth. The only certain case of this group is the one of which the skeleton is here shown. (Caroline Crachami. History and clinical features quoted in Fig. 717 as recorded by Sir Everard Home. Some of the other cases possibly belong to this group but this can only be conjectured; "grouping" is, of course, an artificial process for purposes of convenience. It will be clear that the "groups" shade off into one another as do "groups" of cases of other conditions.) In Group II the growth change begins in early infancy and the characters shown correspond, broadly, to this age. In Group III the growth change begins in later childhood but before puberty; the characters shown correspond, broadly, to that age. It is held by some observers that there may be a further fourth group. But this is problematical, and there is no such case shown in the following series of photographs. Most cases of true dwarf growth or ateleiosis show "infantilism," but this is not invariable—thus of two brothers in Group II, aged 60 and 62 years respectively, each of height 3' 9", one shows "infantilism," but the other (Plate CC (48)) does not¹. (The term "infantilism" is defined on page 368.) (61) shows ateleiosis in the equine species as well as the condition (Groups II and III) in the human subject. In the following series of photographs the order of arrangement follows the above grouping; the first in each group shows the condition contrasted with the normal individual of as nearly the same size as could be obtained.

¹ [It is by no means easy to discriminate with respect to infantilism between Ernesto and Primo Magri; in facial expression they are now almost interchangeable, and no medical examination has been reported since that of 1865: see our p. 502. Error.]

PLATE Z (38). Caroline Crachami and a normal child. The proportions shown by these two skeletons are nearly the same, but the head of the dwarf is, relatively to height, larger than that of the normal child. The following table shows their comparative proportions. (Since nearly all epiphyses are lacking in both, measurements of diaphyses alone are considered in relation to measurements of head and trunk and total stature.)

Normal Infant		Ateleiotic Child	
$\text{Index} = 100 \times \frac{\text{Length of radius}}{\text{Length of humerus}} = 100 \times \frac{10}{12} = 8\frac{1}{3}$		100 :	
$\text{Index} = 100 \times \frac{\text{Length of tibia}}{\text{Length of femur}} = 100 \times \frac{13}{15} = 86\frac{2}{3}$			$\frac{11}{13}$

The comparative measurements of these two skeletons from vertex of skull to margin of inferior surface of os calcis is as 40 is to 34. Made up as follows:—

Vertex to upper border of symphysis pubis	23	19
Upper border of symphysis to margin of lower surface of os calcis	17	15

In these proportions the following measurements occur:—

Episternal notch to upper border of symphysis	12	10
Vertex to episternal notch	11	9

The mid-point between vertex and inferior surface of os calcis is above the symphysis and is at the centre of the body of the 5th lumbar vertebra in each case. The proportions of these two skeletons are thus nearly the same, and differ only in the fact that the intermediate segment of the limbs is relatively shorter in the ateleiotic, a condition which approximates, more nearly than the infant's does, to the condition in the normal adult. Both show the ordinary proportions of infancy and childhood in the respect that the lower extremities are a little shorter in proportion to total height than in the normal adult¹. The ossification of the cranial membrane bones is apparently as far advanced as the normal, and so is the part of the clavicle (*i.e.* the whole of the shaft and the acromial end) that develops in membrane. The lower jaw also appears to be normally advanced as regards ossification; but this again is mainly a membrane, bones being developed primarily in the tissue investing Meckel's cartilage. Bony union of the symphysis occurs in the second or third year and has occurred here. But the angle of the jaw is very open, as in the foetus (contrast with that of the child shown, young as this is). The epiphysis for the sternal end of the clavicle is not present, but this does not normally appear until the 18th to 20th year. The ossification of all other bones is greatly retarded and for the most part less advanced than in the case of the normal infant shown. Thus the only epiphysis present is that for the head of the femur which normally does not appear before birth. That for the lower end of the femur, which normally appears before birth, though present in the infant skeleton shown, is lacking in the case of the dwarf. The three centres for each of the innominate bones of the pelvis (namely one for the ilium, one for the ischium and one for the pubis), normally present at birth, are here present, but union between the rami of the pubis and the ischium has not yet occurred. This normally takes place at about the 8th to 9th year and should therefore, probably, have appeared if ossification were normal. At her age (9 years) the following centres should be present, but are all lacking: one for the head of the humerus (normally appearing in the first year of life), one for the great tuberosity (3rd year), one for the lesser tuberosity (5th year), the last two should be united (7th year), one for the capitellum (5th year), one for internal epicondyle (7th year), lower end of radius (2nd year), upper end of radius (5th year), lower end of ulna (5th year), centres for all the bones of the carpus (1st to 8th year) except the pisiform (12th). Ossification should be present in the epiphyses for all the metacarpal bones and phalanges of the digits (3rd to 5th year), for the great trochanter of

¹ Such proportions of infancy and childhood are maintained through life in ateleiosis, that is to say these individuals never attain the normal adult relative proportions of length of extremities to head and trunk, however old they may live to be. (See accounts of individual cases.) The difference is slight, however, and becomes less as age advances and growth slowly proceeds. The same is seen in cretinism and other varieties of dwarf growth that present bone changes like these. It is in marked contrast to the state of affairs in achondroplasia.

the femur (4th year), upper extremity of tibia (normally present at or soon after birth), lower extremity of tibia (2nd year), lower extremity of fibula (2nd year), upper extremity (4th year), the epiphyses of all the bones of the tarsus and metatarsus (normally occurring in all at the end of the 4th year) and the epiphyses of all the phalanges of the digits (8th year). There is no sign of ossification of any of these epiphyses nor of its appearance in the bones of the carpus or tarsus except in the os calcis and astragalus (in which centres normally appear in the 6th and 8th months of extra-uterine life respectively). There is no sign of a patella (here ossification normally begins during the 3rd year). The tibia shows no tubercle (for attachment of the ligamentum patellae) and no sign of a crest, being cylindrical in section instead of triangular. Thus the bones in which, at the time of death, ossification could be said to have occurred normally are the bones of the cranial vault, the parts of the clavicles present and possibly the pelvis. The vertebrae also cannot be stated to be defective in ossification to date. In the case of the ribs centres for the head are present in all. These usually only appear some years later (at puberty). So that the ribs are in advance of the normal in this respect. Dentition corresponds to the normal for the end of the 2nd to the 6th year. All the bones are very thin, light and smooth, and show no markings for muscular attachments. Although the latter could hardly be marked at her age yet the bones are actually smoother than those of the infant shown. The processes of ossification, both chondral and periosteal, have thus been for the most part reduced to a minimum, or, with the above exceptions, brought to entire abeyance since the time of birth.

(40). Skeleton of ateleiosis in a male (Nicholas Ferry, "Bébé") who died aged 22 years. Height measured at death was 89 cm.¹ If this skeleton be compared with that of (38), who died aged about 9 years, it shows the difference that centres of ossification for all the epiphyses are present and that chondral ossification seems to be as far advanced as the normal for the age. Both patellae are present. With a magnifying lens it can be seen that the epiphyses of the long bones of the extremities are not united to the diaphyses. But this cannot be definitely stated to be abnormal at this age. As in (38) all the bones are exceedingly thin and light. They are smooth and show practically no markings of ridges and grooves for muscular origins and insertions as occur in the normal. All the tuberosities are very ill developed. The crests and spines of the ilia, and the tubera ischii are very little developed, and the pubic bones are very thin and light; the pelvis, except for the fact that processes of ossification are, as regards time, more advanced, resembles that of a young child. The vertebrae and ribs, with the above exceptions as to lightness, thinness, etc., appear to be normally ossified for age. The skull shows the following peculiarities: both jaws are edentulous and whether as cause or effect of this, or not, their alveolar margins are exceedingly ill developed. The lower jaw, *as regards its angle*, resembles (38) in showing the peculiarity that it approximates to that of the foetus (though not to the same degree as (38)) more nearly than does the lower jaw of the young child shown. The mental foramen is situated almost at the alveolar margin of the jaw, thus resembling the condition in the edentulous jaw of old age and differing from that of the infant. The nasal bones are markedly prominent but this would not appear to have any pathological significance and is probably an individual variation or peculiarity (within the normal) or it may be a racial feature. The shape of the cranium resembles that of (38). It is quadrate, and brachycephalic with a breadth/length index of 83.3, and should be compared with those of other ateleiotic dwarfs here shown. The height/length index is 91.6 approximately. The general proportions approximate to those of infancy or early childhood, the mid-point between the vertex and the soles of the feet falling well above the upper extremity of the symphysis pubis. The femora are, however, relatively a little longer than in the infant, as is also the case in (38). The tibio-femoral index is 75.0, the radio-humeral index is 57.14². In brief it may be said that the peculiar features shown are nearly the same as those of (38) but are all less marked, probably because this individual (39) was of adult age while (38) was aged about 9 years at time of death. These skeletons should be contrasted with those of achondroplasia shown, when the marked differences in the relative length, thickness and curvature of long bones (in the latter condition), shape of skull, proportions of length of limbs to trunk, etc. etc. will be clearly seen.

GROUP II. PLATE AA (41). Male ateleiotic dwarf, aged 28 years. Height 3' 7". Standing between an adult man of medium height (seen only in part) and a normal boy of 6 years. "The physiognomy and proportions are childish and the sexual organs infantile while the attitude, expression and markings of face are suggestive of age." (Hastings Gilford.) The muscular development is very feeble, as of a child; muscular outlines are very feebly marked; they are those of childhood; except for this, however, the shape of the figure is that of a later age. Though the proportionate length of lower extremities to total height is that of childhood the lower extremities are considerably longer, proportionately, than in the child by his side. The tibio-femoral index, *i.e.* 100 (length of tibia)/(length of femur) is as follows in these two: In the normal child = $100 \times 8/10$. Index = 80.0. In the ateleiotic individual these bones are as 9 is to 12. Index 75.0. As in Cases (38) the femur is proportionately longer in the ateleiotic case

¹ [The skeletal height is 92.5 to 98.5 cm. but we think has been exaggerated in the setting up. Hastings Gilford (Bibl. No. 664, p. 638) states that the skeleton is 98.5 and "his height at death must therefore have been quite 96 cm." Knowing how skeletons often are set up, we do not agree wholly with the "therefore." Editor.]

² [I am unable to verify Dr Rischbieth's value; it would, roughly from the photograph of the skeleton, appear to be nearer 72.0. Editor.]

than in the normal child of about the same height and in this respect approximates more nearly to the condition in the normal adult.

(42). Female ateleiotic dwarf, aged 18 years. Height 2' 9½". "A normal adult hand is introduced for the sake of comparison. Note the infantile physiognomy and the crowded teeth. A radiogram showed that ossification was equal to the normal for 6 years." (Hastings Gilford.)

(43). Heads of 17 cases of ateleiosis of the second group. "Their proportions and facial characters are childish, though they show the superficial markings of age."

The following table gives the names of these dwarfs as far as we have been able to ascertain them.

Minnie Warren pp. 361, 568 Bibl. No. 240 = (117)	Commodore Nutt pp. 361, 568 Bibl. No. 240 = (117)	Fren... = (42) Ann... (Laible) p. 406, ftn.	Prince Mignon - (118)
Boruwaski pp. 360, 404 Fig. 693 = (67)—(68)	?		Franz Rossow Fig. 697
Baron Ernesto Magri p. 406 Fig. 690 Bibl. No. 248 = (48)	Count Primo Magri p. 406 Fig. 690 Bibl. No. 248	Lavinia Warren Countess Magri pp. 361, 568 Bibl. No. 240 = (120)	Rossow Fig. 697 ?
Franz and Karl Rossow Bibl. No. 332 Fig. 697	Mulatto Dw Chiquita = (41)	Charles Stratton (Tom Thumb) pp. 361, 568 Bibl. No. 240 = (120)	Lavinia Warren (Mrs Tom Thumb) pp. 361, 568 Bibl. No. 240 = (120)

Photographs (41)—(43) are reproduced by kind permission of Mr Hastings Gilford and the Royal Society of Medicine.

PLATE BB. Tyrolese Dwarf (44). Josefa Prinz (see Fig. 689), aged 26 years, height 109 cm. (in shoes), and her mother, aged 70 years, of normal size. Josefa is "well formed, has graceful limbs, animated, quick and precise of movement, of friendly disposition and pleasant facial expression. The shape of the head is not in the least peculiar, the thyroid gland not enlarged; her voice is childish; she sings well. Her intelligence is obviously quite normal." "She follows dress-making as a trade, and supports herself and her mother thereby; she is regarded as a very stylish tailoress. She has frequently exhibited herself in Munich, Innsbruck, Bozen, and St Moritz." She differs from the cases (41) and (42) in that her facial appearance and expression are not infantile or childish but are those of an adult and so, as far as can be judged, are her proportions.

(45). Rudolf Prinz (see Fig. 689), aged 24 years, height, in shoes, 104 cm., without shoes hardly 100 cm. "Shape of head quadrate, parietal eminences very prominent, the transverse interparietal diameter very great. Bridge of nose depressed, slight moustache. Voice childish, somewhat squeaky, no enlargement of thyroid gland; skin of face wrinkled. Movements animated and precise." Ulrich Prinz (brother of the last), aged 22 years, "of the same height and presenting the same features except that he shows no trace of moustache." "With these is their eldest brother, of normal proportions (height 5' 8"

in shoes). Rudolf is a tailor by trade but does not work regularly at it because there are enough tailors in the valley (Innthal) already." These two cases differ from the last in the shape of the skull and the facial appearance, both of which are childish or infantile.

(46). Susanne Kleinstein or Jenal (see Fig. 689), aged 28 years, height 108 cm. "She, it is true, is of somewhat simple disposition, but grosser defects of intelligence are not to be observed in her either. She has a very big cranium, the bridge of the nose is depressed and broadened, the eyes are wide apart, the skin of the face is wrinkled, the neck very short, there is no enlargement of the thyroid gland. The extremities are well proportioned, movements in every way normal."

(47). (a) Julius Kleinstein, aged 30 years, height 108 cm. in shoes. "A large quadrate skull, forehead bulges somewhat forwards, bridge of nose depressed, slight growth of hair upon upper lip, neck short, skin of face wrinkled, no enlargement of thyroid gland, deep, somewhat peculiar voice. All limbs well proportioned, movements quick and accurate. Friendly disposition, normal intelligence. His trade is that of tailoring and he conducts a business of his own in this. (b) Marie Kleinstein, sister of the last, aged 26 years, height 93 cm. "Very large angular skull, forehead bulging forwards, bridge of nose depressed, neck very short, skin of neck wrinkled. No enlargement of thyroid gland. Limbs graceful. Movements very quick and precise. No defect of intelligence can be observed; did very well at school. Occupation housework." (c) Julie Kleinstein, sister of the two last, aged 14 years, height 86 cm. "She shows just the same features as her sister Marie, except that the cranium is proportionately even bigger than in the latter. She is still at school where she is doing very well." In the last three cases the quadrate form of the skull, with its bulging forehead and depressed nasal bridge, is more clearly shown than in the other cases. These features are also very well shown in the next case and in his brother. (44) to (47) are from photographs kindly provided by Dr Schmolek.

PLATE CC (48). Ernesto Magri, a native of Italy, aged 62 years, height in shoes 45" (see Fig. 690). A large quadrate skull with bulging forehead; bridge of nose somewhat depressed; a considerable growth of hair on upper lip. Neck very short; skin of face and neck much wrinkled but not dry, cracked or in any way abnormal. A peculiar "waxy" colour much like that seen in pernicious anaemia. Thyroid gland felt, not enlarged. Pomum Adami hardly palpable. Voice high pitched and squeaky; "thin" or "piping." Proportions those of early childhood, i.e. head relatively large, neck short and limbs relatively short for the body, all well formed. Movements accurate and precise and certainly not slow, but all performed with a curious air of deliberation. Hands proportionately neither larger nor smaller than normal, but they have the shape of those of the infant or young child (compare case (41)), this is shown in the comparative shortness of the fingers, breadth of the hand, its absence of muscularity and "character" or "expression," and the shape of the finger nails; the skin of the hands is much wrinkled but not dry, cracked, or in any way abnormal. Teeth normal and all are still present except the third molars, which have never erupted. A music hall artist. Intelligence good; a man of some education; speaks English fluently with only a trace of accent, writes it idiomatically (in reply to negotiations with a view to this photograph) in a clear, firm hand showing individuality and which only an expert could distinguish from that of any ordinary man of his age. He is somewhat nervous or timid but shows no other peculiarities of disposition. A brother aged 60 years is of the same height and shows the same features in all respects except that there is no trace of hair about the face. Neither of these individuals has suffered at all generally from ill health and has had no sickness of note except measles and chickenpox in infancy. Family history of disease negative.

(49). Ateleiotic male, aged 22 years, height 3' 3" approximately. Shows the same features as (47) and (48).

(50). Heinrich Glauer, aged 24 years, and Bruno his brother, aged 20 years, both of height approximately 3' 2". Both show the same features as (47) and (48) with modifications. Large quadrate skull with prominent eminences and bulging forehead; bridge of nose depressed. The facial appearance of early childhood but showing the markings of age. There is, however, no increase of subcutaneous tissues or marked wrinkling of skin. Neck short. Relatively short extremities (the proportions of early childhood); hands of the same period. No trace of hair about the face. Voice higher pitched, squeaky and "thin" or "piping." Both have a peculiar "waxy" complexion much like that of pernicious anaemia. Thyroid gland palpable, not enlarged. Pomum Adami very little developed. All movements quick and precise. Intelligence shows no defects. Both read and write well in their own language (German), but speak no English or French. Answer questions promptly, quickly and clearly and convey the impression that they are particularly "cute" (if the expression may be employed). Show no timidity or other peculiarities of disposition. Both are more muscular than most cases of this class. Neither has suffered from general ill health and neither remembers having had any "illness."

PLATE DD (51). Ludwig Ullts, a German dwarf, "the smallest man in the world," aged 18 years. Height 34". Head very large, quadrate; frontal and parietal eminences very prominent. Forehead bulging, bridge of nose depressed. Neck short. Thyroid gland felt, not enlarged. Pomum Adami not

developed. Proportions and facial appearance those of infancy, as are the hands. Limbs and body very thin and weak. No trace of hair about face. Voice high pitched, "thin" or "piping" and squeaky. Intelligence good. Reads and writes well and speaks English slightly. Cephalic index 77.9; *i.e.* skull is mesaticephalic; height index 77.9. The mother of this individual is a typical achondroplastic woman of height about 3' 3". Her sister and niece, the daughter of the last, are achondroplastic and of the same height (3' 3"). See Boeckh's Case, Figs. 608 and 620. The father of Ludwig Ulpts is said to have been a typical ateleiotic dwarf of height about 3' 6". His photograph is shown, with these other individuals, in the section on achondroplasia. The depressed nasal bridge which Ludwig shows is somewhat like that of achondroplasia, but there are no other symptoms of that condition; he presents no other resemblance whatever to an achondroplastic individual. See Plate FF (62) where father and mother are also shown.

(52). Otto (!Bottcher, see p. 406), a German dwarf, aged 21 years, height in shoes 36" approximately. Head large¹, cranium quadrate, forehead bulging, bridge of nose depressed; facial appearance as well as shape of head and its proportional size to rest of body those of early childhood, but face shows the markings of age. The colour of the face is peculiar; it is of a "waxy" lemon-yellowish appearance, much like that seen in pernicious anaemia. Neck short as in infancy. Trunk and extremities well formed, but the proportions are those of infancy, not of adult age (*i.e.* the extremities are relatively rather short). The hands are also of childish proportions (compare case (41)). Voice childish, high pitched, "thin" or "piping" and rather squeaky. Thyroid gland palpable, not enlarged. Pomum Adami hardly developed at all. Movements certainly not slow and quite precise but are carried out with a curious air of deliberation difficult to describe, but quite obvious at a glance. Music hall singer. Intelligence good. Reads and writes well and speaks English very well. Dentition normal, teeth sound but no third molars (age, however, only 21 years).

(53). Forgères, a Frenchman, aged 35 years; another example of this condition, height 3' 9". Large square head, with prominence of frontal and parietal eminences. Short neck and childish proportions. Skin of face wrinkled. Slight growth of hair on upper lip, etc. His facial appearance is not childish but is that of a young adult. Cephalic index 80.0, *i.e.* he is verging on the brachycephalic. Height index 80.0 approximately.

(54). Smaun Sing H'poo, Burman, aged 26 years, approximate height 3' 1". This case differs considerably from all the others shown above except Case (44) (Josefa Prinz, which it broadly resembles), in that the proportions of the size of the head and length of neck and extremities to trunk, as well as the facial appearance, are those of early adult life (corresponding to an age, however, less than his is), and not of infancy. The shape of the head is markedly different from those cases; it is not quadrate and shows no great prominence of eminences; the forehead is not bulging but, rather receding; the bridge of the nose is not depressed². The size of the head compared with that of (52), of about the same height, is as follows: length is as 8 is to 10; breadth is as 7 is to 8; while height is as 7 is to 8, in (52) and (54) respectively. The neck is not very short and the proportions of length of extremities to total stature are those of an adult and not those of infancy or early childhood. The hands also show the shape and proportions of the adult, the fingers being relatively long. The limbs are well formed but they and indeed the whole figure is slighter than in the above cases. No trace of hair about the face. Pomum Adami very little developed. Thyroid gland palpable, not enlarged. Voice high pitched, "thin" or "piping" and squeaky. When observed he made demonstrations of affection towards a small female dwarf whom he hugged and kissed in public³. Movements remarkably quick. Quite intelligent. Speaks English very well for a coloured alien. Juggler by profession. The size of the head, which, compared with other cases, is relatively small, its shape, the receding chin and the quickness of movement shown suggest the possibility of microcephalic dwarf growth here. But there is no idiocy; the intelligence is not in the least defective in any way. The case is possibly one of the same type as that illustrated by (38) in which the general hypoplasia affects the cranium and cerebrum to the same extent as other parts (though to a less extent than in (38)); in that case there was quickness of movement and other features suggestive of microcephaly but the head is, actually, *bigger* than normal for stature and in the present case it is certainly not less than normal. Many of the differences from the above cases here shown may be due to the occurrence of the disease in a different race (Burmese), but not all can be due to this cause because (42) shows similar features in many ways, *e.g.* adult facial appearance, adult proportions, etc.

PLATE EE (55). Four English dwarfs belonging to Group II of the ateleiotic class. The two elder were known as "Mr and Mrs Tom Thumb Junior."

¹ The cephalic index of this skull is 80; *i.e.* it is verging on the brachycephalic. The height index, as far as this could be measured, is also 80, *i.e.* the cranium is a relatively high one (but this measurement is only approximate).

² The cephalic index is 87.5; the cranium is thus brachycephalic. The height index is 87.5. [The equality of the breadth/length and height/length cephalic indices in all the cases (51), (52), (53) and (54) is in accordance with Dr Rischbieth's manuscript and is given on his responsibility. EDITOR.]

³ The Burmese are Mongols at least in part and their facial and cranial characters are the same as the Southern Chinese, *i.e.* they are either mesaticephalic or brachycephalic. In the difference in the size and shape of the head and some of the other features which mark this case off from the others it seems possible that these may be due to race alone.

GROUP III. (57). Martin Lane, aged 28 years, height 4' 9", and his brother, aged 13 years, and a normal adult. "The ateleiosis (or alteration in growth) began at the age of 14 years. Note absence of sexual hair, childish sexual organs and youthful aspect and proportions combined with the weathering of age" (Hastings Gilford). The musculature is very feeble. The length of lower extremities though proportionately greater than in the last group is, however, shorter than in the average normal adult and is approximately the same as in the boy of 13 years. Thus the proportions are (1) in the ateleiotic dwarf: length of lower extremities/total height = 121/264, (2) in the boy of 13 it is 120/264. The length of the femur compared to length of tibia is relatively greater in the ateleiotic, thus approaching more nearly the condition in the average normal male adult. The proportions are (1) in the ateleiotic dwarf: length of femur to length of tibia as 7 is to 5, (2) in the boy of 13: they are as 6 is to 5. Thus in (40), in (41), and in this case the ratio of length of femur to that of tibia is not the same as in the child of the same approximate stature, but is more nearly that of the adult, *i.e.* the femur becomes relatively longer. As well as this, as will be seen, the lower extremities as a whole become proportionately longer in this group, following the ordinary alterations of proportions as age advances, though not to the full extent.

(56). Reinhold Tschuschke (Tyrol: see p. 406 *ftn.*), aged 36 years, of about 4' 9" height. Quite intelligent, reads and writes well but only in German.

(58). Gustav Geschke (Berlin: see p. 406 *ftn.*), aged 52 years, height about 4' 9". Quite intelligent, reads and writes English and German well, and speaks English well.

(59). Three cases of ateleiosis Group II and two of Group III placed together for contrast. The smaller figures are those of (50) and (52), the larger those of (56) and (57).

PLATE FF (60). Large group of ateleiotic dwarfs with four of achondroplasia. These and others were exhibited at Olympia, London, 1909—10.

(61). Ateleiosis in the equine species. Note the foal-like appearance of these ponies; their very small size, thickness and general immaturity. They differ markedly from the ponies of normal growth (such as Shetlands), being little heavier than greyhounds of medium size; they have less than a tithe of their strength and endurance. (The man in the background is 6' 2" in height.) The smaller human dwarfs belonging to Group II, are shown in Figs. 50 and 52. The larger human dwarf belongs to Group III and is aged 30 years.

(62). Ludwig Ulpts, shown in (51) and (61) and his father and mother. These are also referred to in the Pedigrees (Achondroplasia, Boeckh's Case, Figs. 608 and 620). The sister of this woman and her daughter are also shown in the illustrations of achondroplasia (Plate Q (9)) and the first also appears on the plate showing achondroplastic types (Plate S (14) F., F').

PLATE GG (63) and (64). Cretinism in a brother and sister, aged 28 and 25 years respectively. Reproduced from photographs kindly sent by Professor G. R. Murray. The first is 4' 5" in height; his sister is 4' ½". Distinguished from the above condition by mental deficiency (it can be seen that these two are idiots), bodily lethargy and slowness of movement and other features. The skin is coarse, dry, scaly, thickened and wrinkled, the hair coarse, short, brittle, dry and sparse. Note the broad nose and flabby cheeks. The eyelids are swollen, with a solid oedema, and the hands and feet show a similar condition. Both these individuals, but especially the female, show the presence of characteristic fatty swellings on each side of the neck, and the female shows a marked goitrous enlargement of the thyroid gland. Note in the male the wide open mouth, with cracked and fissured lips, dribbling saliva (in many cases the tongue is held protruded). Note in the female the flabby pendulous mammae and in both the tumid adipose abdomen. Their proportions are those of children, as in ateleiosis; but the features enumerated render the two easily distinguishable. This condition is due to (a) congenital absence, partial or complete, of the thyroid gland, with consequent defect of its secretion, (b) to its atrophy or operative removal in childhood with the same result, or (c) to the advent of a goitrous enlargement of the gland (goitre, "Derbyshire neck" or bronchocele), with the same result¹. Cretinism is sporadic as in these cases, or endemic, as in certain parts of Europe, Asia and America which are mountainous, *e.g.* Switzerland, Savoy, Tyrol, Pyrenees, Himalayas, etc.

¹ It must be stated however that the advent of goitrous enlargement of the thyroid gland, if this occurs in early childhood, does not necessarily produce cretinism. Most cases of cretinism show no goitre and most cases of goitre show no cretinism. It is defect of the internal secretion of this gland during the period of growth that determines the occurrence of cretinism. It is only when a goitre produces or is associated with this defect at this time that it is associated with cretinism.

D. Portraits of Famous Exhibition and Historical Dwarfs¹.

It has not been considered necessary to discuss the majority of these individuals at length. We give in general only references to their mention in the text of the *Treasury*.

PLATE HH (65). Mademoiselle Anita. A Hungarian dwarf, said to be 25" tall and 25 years of age. Exhibited throughout England and Scotland in 1911. She belongs to Group II of the ateleiotic dwarfs, but has the adult face of Josefa Prinz (44) and Boruwłaski (67): see p. 363.

(66). Jeffrey Hudson, from the portrait by Daniel Mytens in the National Portrait Gallery: see *Iconography* (45). If the portrait was painted in 1637, Hudson was then 18 years of age. See p. 360. Hudson belongs to Group II of the ateleiotic dwarfs.

PLATE II (67) and (68). Count Joseph Boruwłaski from Bonomi's life-size cast taken from life, in the Museum at Durham: see *Iconography* (122). Boruwłaski was said to be 98 when this statue was made. He shows, however, the same adult face in earlier portraits². He belongs to Group II of the ateleiotic dwarfs: see pp. 360, 404 and Fig. 693. He was 3' 3" in height.

(69). Nannette Stocker and Johann Hauptmann, famous show dwarfs of the late 18th and early 19th century (London, in 1815), and belonged to Group II of the ateleiotic dwarfs. Nannette Stocker was born about 1782 at Kammer in Upper Austria; she was a very fine child at birth, but ceased to grow at the age of 4 years. At the age of 33, she was said to be 33" high, and to weigh 33 pounds. Her mother and brother were of normal height. Johann Hauptmann was born about 1778, of normal parents, at Ringendorf, Lower Rhine. He met Nannette at Strassburg in 1798, and from this time the two of them travelled about Europe together, earning their living by performing, Nannette on the piano and Johann on the violin. Both were well proportioned: see Kirby's *Wonderful Museum*, Vol. v. pp. 228—9 and *Iconography* (154).

(70). Thérèse Souvray, the betrothed of Bébé. She called herself Madame Bébé. She and a dwarf sister were born of normal parents. She was 73 years of age, when Virey made the sketch of her from which our cut is reproduced, and her height was 86.4 cm. She appears to have been healthy, active and well proportioned, and probably she as well as her sister belonged to Group II of ateleiotic dwarfs. Her face is not infantile: see *Iconography* (140 and 141).

PLATE JJ. See below in Section E.

PLATE KK (73). George Romondo, Jewish rickety dwarf. Raymondo or Romondo was born about 1765 of Jewish parents in Lisbon. He was about 3' 6" in height. He was a very clever eccentric mimic and obtained his living in England by imitating in public places the cries of different animals or the sounds of musical instruments. See Kirby's *Wonderful Museum*, Vol. iii. pp. 113—6. See also *Iconography* (156*).

(74). Owen Farrel, the Irish dwarf, born in County Cavan, Ireland, 1716. He acted as a footman for a time, but subsequently begged in the streets of London. He was 3' 9" high. He sold his body to Mr Omerod a surgeon, and later "Dr Hunter" became possessed of one of his thigh bones, which measured only 9.5" (? which Hunter). He was remarkably strong and could carry four men, two sitting astride on each arm. We have been unable to find any trace of either skeleton or femur in the Hunterian museums in London and Glasgow. The prints of Farrel seem to indicate a special form of achondroplasia, but this has been questioned: see Kirby's *Wonderful Museum*, Vol. v. p. 364. There are many prints: see *Iconography* (155, 158).

(75). The family Kostaskey, probably ateleiotic in Group II. The four eldest children are said to have ceased growth in their fourth year. For a further account see Bibl. No. 232 and Pedigree, Fig. 744.

(76). Wassilievitch, a Russian myxoedematous (?) dwarf, aged 51. He was the youngest of a family of six, all the others of normal build and healthy. He had a wrinkled, beardless face, and was quite intelligent, although he had had little or no education. Achondroplasia and probably cretinism seem excluded: see Bibl. No. 198.

PLATES LL—PP. See below in Section E.

PLATE QQ. See below in Section G.

PLATE RR (97). Simon Paap was born at Landvoorst, in Holland, in 1789. His father was a fisherman, and he had two brothers and two sisters of normal height. Simon ceased to grow at three years of age; his height was 28" and his weight 27 pounds. He was well proportioned in limbs and body, but his head was rather too large. He probably belonged to Group II of ateleiotic dwarfs, and may be

¹ [While Dr Rischbieth is not responsible for the final form of Sections A, B, C of these Descriptions of Plates—corrections and additions having been made to his manuscript—Sections D, E, F, G are based on material collected and arranged in the Eugenics Laboratory. EDITOR.]

² The facial appearance in this dwarf is much less infantile or childlike than is usual in this condition even in the aged, and is, indeed, that of an adult. The fact that he was perhaps older, at the time the cast was made, than were most of the other cases shown in illustration, does not appear to explain this fully. It appears to be an individual peculiarity.

compared with Mademoiselle Anita (height 25"), and Ludwig Ulpts (height 34")—"the smallest man in the world": see (51) and (65).

(98). Wax model of Nicholas Ferry Béb , in his clothes and with a wig of his own hair prepared by Jeanet, his surgeon, and preserved in the Musée Dupuytren, Paris. It probably gives him too dumpy an appearance, and it is possible that parts of the model as it now stands have sunk (note especially the state of the stockings in the photograph). B b  was 18 when this model was taken, four years before his death. He was born in the Plain of the Vosges, 1741. When 4.5 years old he was said to be 61 cm. long, 72.5 cm. when about 18, and 89 cm. at his death; in the last few years of his life he developed very considerably and had no reserve of strength for this growth. His case is usually spoken of as a case of true dwarfism or ateleiosis, but it has been recently suggested that it was at least complicated by congenital syphilis. See Fig. 745, Bibl. Nos. 20, 33, etc. and *Iconography* (82), (83), and (121). Cf. Plate Z (39) and (40).

PLATE WW. This plate illustrates further cases of ateleiotic dwarfism, partly from famous exhibition cases, and partly from reported medical instances. (117) and (120) reproduce four dwarfs famous for many years in the annals of showdom. Charles S. Stratton ("General Tom Thumb") was the son of Sherwood E. Stratton and was born at Bridgeport, Connecticut, Jan. 11, 1832, of parents mentally and physically perfectly normal; he is said to have weighed 9 lbs. 2 ozs. at birth. At about 5 months he weighed 15 lbs. and measured 25", and Wood states that up to 1845 he did not increase in stature, and not in weight by more than two ounces. His parents had three other children of ordinary size¹. When Barnum first saw him (in Nov. 1842) "he was a perfectly-formed bright-eyed little fellow, with light hair and ruddy cheeks, and he enjoyed the best of health. He was exceedingly bashful." In 1862 Stratton met in connection with Barnum "an extraordinary dwarf girl named Lavinia Warren, who was residing with her parents at Middleboro', Massachusetts," and whom Barnum at first exhibited with Commodore Nutt. The latter, according to Barnum, had fallen in love with her, but Tom Thumb, taking a holiday, came to see Barnum, and being introduced to her, succeeded in gaining her consent and married her on Feb. 10, 1863, at Grace Church, New York. In 1864 Tom Thumb and his wife came to England with Commodore Nutt and Mrs Stratton's sister, Minnie Warren. The marriage of Tom Thumb and Lavinia Warren resulted in the birth, on Dec. 5th, 1863, of a female child, Minnie Tom Thumb, who weighed at birth 3 lbs., but was a fine healthy child weighing 7½ lbs. at a year old; she died from inflammation of the brain at the Norfolk Hotel, Norwich, Sept. 1866, while her parents were on tour in the Eastern Counties. According to Barnum, Tom Thumb erected a tall marble shaft surmounted by a life-size statue of himself in Mountain Grove Cemetery, Bridgeport. Commodore Nutt, otherwise George Washington Morrison Nutt, was the son of Major Rodnia and Maria D. Nutt; his father was a substantial farmer of Manchester, New Hampshire. He was born on April 2, 1844. He came in touch with Barnum in December, 1861, who made what he terms a "palpable hit" with him. Nutt was "a most remarkable dwarf who was a sharp, intelligent little fellow with a deal of drollery and wit. He had a splendid head, was perfectly formed and was very attractive; in short, for a 'showman' he was a perfect treasure." After his failure to win Lavinia Warren, Barnum tried to console him by suggesting that he should marry Minnie Warren. This marriage was several times reported, but never came off, and Nutt about 1876 married "a charming young girl, Miss Lilian Elston of Redow City, California, who tenderly cared for him till his death." There is no reference to any offspring of this marriage. Nutt when born weighed 10 lbs. 2 oz., and when aged 20 is said to have weighed 24 lbs. and to have been 29" high². His parents were mentally and physically normal and in comfortable circumstances. They had four other children. The first, a brother in California, weighed 165 lbs. when he left home aged 24; the third was also a "very large person." The second, aged 24 years in 1864, weighed only 65 lbs. and was 4' 1" in stature; he appears to have escorted the Commodore, who was apparently the fourth child. There are no details of the fifth child. It is said that there is nothing in the history of the Commodore or his family to account in any way for "his miniature features and frame." The appearance of a semi-dwarf brother must, however, be taken into consideration. Lavinia Warren was born Oct. 31, 1842, in Middleboro', Mass., of parents in comfortable circumstances. She is said to have had four brothers, one in Utah and two (in 1864) living with her parents (? the fourth), and three sisters, two of whom were at the same date married. All were of ordinary size except the youngest, Minnie, born June 3, 1846. In 1864 we have:

	Age	Weight	Height
Lavinia Warren	22	29 lbs.	32 in.
Minnie Warren	18	19 lbs.	24 in.

¹ Stratton had a normal sister Mrs Bassett, married and living in New York.

² Garnier says Nutt was 80", when Barnum engaged him in 1860 and 48" when he died in 1881: see Bibl. No. 205, p. 221.

Until Lavinia was a year old she was of the usual size; from that age she increased slowly in stature and ceased entirely to grow at 10 years of age. "She attended school regularly with the other children in the neighbourhood and found no difficulty whatever in keeping up with them in the classes which she attended." Minnie Warren is said to have been of ordinary size at birth, but to have grown very little afterwards. Both sisters are described as healthy and intelligent. After the death of Tom Thumb, Mrs Stratton married Primo Magri (see Fig. 690); she must, when in London in 1911, have been 69 years of age. The later history of her sister appears to be unrecorded. Some account of the family histories of these dwarfs should have appeared in our pedigree section, but we were unable to discover any record of them at the time except the meagre references in Wood (Bibl. No. 138, pp. 412, 418), Garnier (Bibl. No. 205, pp. 206, 221) and Barnum (Bibl. No. 240, pp. 71, 136, 213, 219, 224, 227). A second work of Barnum (*Struggles and Triumphs, or Sixty Years' Recollections of P. T. Barnum*, London, New York and Melbourne, 1889, pp. 88, 249, 255) repeats with but slight additions the facts stated in the *Life of P. T. Barnum*. The above account, while using these books, is chiefly drawn from an anonymous work: *Sketch of the Lives, Personal Appearance, Character and Manners of Charles S. Stratton, the Man in miniature known as General Tom Thumb, and his Wife Lavinia Warren Stratton, including the History of their Courtship and Marriage, Commodore Nutt and Miss Minnie Warren with some account of remarkable Dwarfs, Giants and other human Phenomena of ancient and modern Times*, London, 1865, Brickhill and Bateman. I am not aware that complete and accurate measurements as adults of any of these four famous ateleiotic dwarfs have ever been published. We have Quetelet's measurements of Tom Thumb taken when he was a boy (before 1850): see Fig. 735.

(118). Of "Prince Mignon," clearly a very interesting case of ateleiosis, we have so far no record beyond the photograph.

(119). The details of this remarkable family are given in our Fig. 731^b. It is a case of ateleiosis showing heredity in three generations. The adult dwarf on the left is II. 2, aged 39, height 132 cm. The boy is III. 5, aged 12, height 95 cm., and the girl is a normal daughter aged 8. On the left is a man of normal stature. This is the only case where we have actually portraits from two generations of true dwarfs.

E. Illustrations of Sub-types of Dwarf Growth of Pathological Origin.

PLATE JJ. The myxoedematous dwarf. We have already in Plate KK (76) seen a probable representative of this class in the show dwarf Wassilievitch.

(71^b). Photograph of a water-colour drawing of a typical Dutch sample of a myxoedematous dwarf. The colours of the original convey the expression in a manner which can only be weakly reproduced by our photograph, but still our cut illustrates the type more forcibly than direct photography or woodcut can attain to. The reader should compare with (36). The ateleiotic dwarfs present a number of features common to infantile myxoedema, by which ateleiosis and myxoedema seem to merge one into the other, and it appears not impossible that they have relations in common. Absolutely certain differentiation is not in all cases possible: see pp. 365 and 367 above. We owe this illustration to the kindness of Dr W. Bulloch, who has placed the original in the Eugenics Laboratory.

(71^a). Balthazar Zimmermann, a show dwarf described by Quatrefages. He measured 76 cm. when aged 16, and was thus comparable in stature at that age with Bébé. An account of Zimmermann will be found in Fig. 765, and Bibl. Nos. 187 and 232 may be consulted. He was probably myxoedematous but his physiognomy compares closely with that of a number of ateleiotic dwarfs.

(72). This cut contains four brothers, sons of the same parents, and our information concerning them is conveyed in a letter from Dr A. Marie: see Fig. 837. He considers that the three youngest represent characteristic myxoedematous dwarfism, the youngest with less of oedematous infiltration and having more of a cretinoid aspect. The eldest presents a case of simple infantilism. Whatever be the causes of dwarfism in this family, whether hereditary or toxic, we can hardly doubt the common origin in all four brothers, and thus the differentiation of these types as noted on pp. 365 and 367 becomes more obscure.

PLATE KK. See above, Section D.

PLATE LL. Types of Indian dwarfism contrasted. Major C. H. James, I.M.S., published in the *Indian Medical Gazette*, November, 1910, an account of three varieties of dwarfs, and most kindly sent excellent original photographs of these and other dwarfs to Karl Pearson.

(77) and (78) show anterior and posterior views of a normal native (*f*), of height 5' 6.5", alongside two achondroplastic dwarfs (*d*) and (*e*), a cretinous dwarf (*a*) and two further dwarfs (*b*) and (*c*), whom Major James classes as cases of infantilism, or "true arrests of general development." The following accounts are provided:

(*a*) The cretin Ralho is aged 30 years, Hindu. Her mother is an inmate of Patiala poor-house. Her father, two brothers and a sister, the latter three, at ages 20, 16 and 11 years, all died of the plague,

but were normal in every way. Her mother says she was normal at birth and ceased to grow at 16. There are no other dwarfs in the family and no history of goitre obtainable. She is an idiot and unable to talk, the breasts and external sexual organs are undeveloped. Her height is 2' 11.5" and weight 2 stone 11 lbs. No indication of a thyroid gland can be felt in the neck.

(b) Piyara Lal, aged 20 years, Hindu goldsmith. Quite intelligent and sharp-witted and quick at grasping new ideas. He has a falsetto voice, penis and scrotum small and undeveloped, no hair on face or pubes. His complexion (see photograph) is very fair for a native. He is active and runs fast. Height 3' 3". Weight 2 stone 11 lbs. The thyroid gland can be felt in the neck. He is said to have stopped growing at 10. It would be natural to class him as a case of ateleiosis, Group II. No family history of dwarfism.

(c) Sewa Singh, aged 28 years, Sikh. Member of a large family, four elder brothers, three elder sisters and seven younger sisters, but only two younger sisters have survived. All said to be normal, and the two surviving sisters are tall women. His height is 3' 4.5", and weight 2 stone 11 lbs. He has good health, is a good rider, roller skater, and plays many games. He has a slight moustache, which began to appear at 25 years, and a little hair on pubes, but his sexual organs are not fully developed. Quick, active and full of fun, sharp as a needle in repartee where banter and pleasantry are concerned; the voice is small and childish. Thyroid gland present and no deformity or bending of bones. It will be seen from the photograph that he is of darker complexion than (b) and that his physiognomy is far more adult. It will be obvious that this is a case where development has gone on to adolescence in some characters even if retarded. He possibly belongs to Gifford's ateleiotic Group III, although the sexual organs have remained infantile. The intelligence of both (b) and (c) seems above that of the average of European ateleiotic dwarfs.

(d) and (e) are typical cases of achondroplasia.

(d) Hamel Singh, aged 27 years, height 3' 9", weight 5 stone 8 lbs., has several normal brothers and sisters, and no other dwarfs occur in family. He is said to have grown till he was 12 years of age and then ceased. The micromelia is of rhizomelic type; the hands and feet are said to be those of a normal man. There is hair on face and pubes, the sexual organs are normal. He is quite intelligent, and reads and writes a little English as well as Gurkhali and Urdu. He is strong and active.

(e) Wazir Singh, aged 47 years, Sikh barber, height 4", weight 6 stone 3 lbs., has no other known members of his family like himself. His growth continued, he states, until 22. His intelligence is normal; hair on all normal parts of his body, sexual organs fully developed. Limbs as shewn in photograph typically achondroplastic like those of (d). His hands are short and broad, and appear from (77) to be "en trident," so that in this matter he is more typical than (d). His feet are large.

PLATE MM (79) and (80). These photographs show a female achondroplastic dwarf, aged 48 years, Lachmi Narain, daughter of Harriji, a Brahman by caste, born at Bindialchal, in the United Provinces. She earns her livelihood as a faqir; has never married. Both parents are dead; she has no brothers, two sisters, who are both normal in size, and have normal children. Lachmi is 36" in height; weight 3 st. 10 lbs.; chest measurement 26"; circumference of abdomen 24"; total length of spine from nape of neck to tip of coccyx 29"; height of head from vertex to mental point 8"; from shoulder to elbow, when forearm is bent, 8"; from hip to knee 9.5"; from hip to sole of foot 19"; circumference of thigh 13"; circumference at knee 9.5"; at ankle 5.75"; length of foot 6"; elbow to wrist 4.75"; breadth of palm 2.25"; length of index finger 1.5"; length of middle finger 1.62"; length of ring finger 1.62"; length of little finger 1.25"; wrist to knuckles 2". The hand is thus typically achondroplastic, and from the photograph "en trident." She has all her teeth except third molars, which have never erupted; the breasts are small and not properly developed; vagina infantile and she has never menstruated. Intelligence good, she can read and write Hindi. She walks well, but slowly with a certain amount of waddle, and states that she soon gets tired. [From a letter of Major James to Karl Pearson.]

(81). A case of pituitary giant growth in a Cashmiri aged 23 years, height 7' 9". Beside him an English man of medium height. Two Indian dwarfs, probably achondroplastic, but age, race, height and nature of underlying condition are uncertain. The appearance of the bigger certainly suggests achondroplasia by the shortness of the limbs, shape of curvatures as far as these are seen; the smaller may possibly be of a rickety nature, but achondroplasia is not excluded. An ateleiotic dwarf from Patiala, aged 23 years, height 28", is shown on extreme right. No full anthropometric or medical description with photograph.

PLATES NN, OO, and PP give further types of dwarfism in marked contrast. We owe these excellent photographs to Professor Nijhoff of Groningen, and one of the chief reasons for publishing them here is to create if possible a strong public feeling against the legislative laxity which permits in modern states reproduction by such deformed persons. Not only are these cases in which the deformities have been or may be perpetuated—the women in (89) and (92) come of an achondroplastic stock and have had achondroplastic offspring—but in each parturition there is grave danger to the mother, and Caesarian

section has been necessary not once, but *repeatedly* in the case of the same woman. When medical science renders it possible for such mothers and their often deformed offspring to survive, is it not needful for the strong hand of the state to intervene,—since natural repugnance appears no longer to guide the instinct of the male,—and prevent the parenthood of deformity by its segregation before adolescence? The world little realises what racial harm is done, when the multiplication of the unfit is rendered possible by increased surgical skill, or by economic provision for the deformed unaccompanied by stringent segregation.

PLATE NN (82)—(84). Rickety dwarf growth in brother and sister, associated with multiple and extreme curvatures of the long bones of both lower extremities on both sides due to bending of softened bone under body weight; and resultant other deformities. The curvatures affect the shafts of these bones

Promontory of Sacrum
6.28 cm.



rather than the regions of junction of epiphyses and diaphyses and are actual curves rather than angles (contrast achondroplasia). In the female, M. B., the pelvis is markedly deformed; and the form of its inlet is tri-radiate; it was diagrammatically represented by Professor Nijhoff as shown. It gave the following measurements: inter-spinous 18 cm., inter-cristal 17 cm.; inter-trochanteric 20.5 cm.; external conjugate 14 cm.; diagonal conjugate 7 cm.; true conjugate 6.25 cm. M. B., who is a single woman, aged 40, shows the scar of the operation of Caesarian section by which means she was delivered by Professor Nijhoff of a normal male child, which was, however, born dead. The condition of the male pelvis may very probably be much the same, but this point being of no obstetric importance is not usually investigated in such cases. In this male, in whom, if anything, the curvatures and deformities are of more extreme grade than in the female, there is considerable rickety deformity of the thorax as well, the sternum is curved forwards and prominent, the antero-posterior diameter of the thorax being increased ("pigeon-breast"); the lateral walls are somewhat depressed or "fallen in" (or, more accurately, "pulled" or "pushed" in by the action of diaphragmatic traction and atmospheric pressure during inspiration on unduly soft bone, "Harrison's sulcus." This latter feature is, however, here not very well marked.) The height of the female, whose age is 40 years, is 86 cm.; that of the male, whose age is uncertain, is 96 cm. They show no other peculiarities than the above. The male dwarf is described as a "merchant."

PLATE OO (85)—(86). A. J., aged 35 years, rickety dwarf. Height 143 cm. Married and has had three children. The first was delivered by craniotomy in her own home. The second was by Caesarian section (Jan. 15th, 1907); the mother recovered, the child a male, normal, was born living. (It was 55 cm. in length and 4055 grammes in weight.) The third delivery was also by Caesarian section (March 7th, 1909); the mother recovered, the child, a male, normal, was born living. (It was 52 cm. in length and 3720 grammes in weight.) The pelvic measurements of this dwarf are as follows: inter-spinous 25 cm.; inter-cristal 26 cm.; inter-trochanteric 30 cm.; external conjugate 17 cm.; diagonal conjugate $8\frac{1}{2}$ cm. The proportions of this woman, apart from small stature and pelvic deformity, are about normal for height and afford a marked contrast to those of the achondroplastic women. She shows, however, a condition of genu valgum or "knock knee" which is too marked to be considered normal or physiological even for her sex. This deformity, that of the pelvis, and her small height are doubtless rickety in origin. She also shows marked varicosity of the internal saphenous vein, etc. on both sides ("varicose veins"), an independent condition, and the influence of the gravid uterus in producing this is shown clearly by the series of photographs.

(87)—(88). A. T., achondroplastic woman, aged 27 years. Height 111 cm. Single. Delivered of first child by Caesarian section by Professor Nijhoff, Jan. 17th, 1904. Mother recovered; child, male, normal, born alive. (Its weight was 2800 grammes and its length 51 cm.) Pelvic measurements of A. T.: Inter-spinous 22.5 cm.; inter-cristal 25.5 cm.; inter-trochanteric 27.5 cm.; external conjugate 18.5 cm.; diagonal conjugate 9 cm. All three of Professor Nijhoff's cases (i.e. (91), (89) and (87)) show the marked obesity typical of the condition in the female adult (as contrasted with muscularity in the male adult), they show the typical features of the achondroplastic condition, shortness and massiveness of limbs, prominent buttocks, characteristic curvatures of the long bones, short broad hands and feet with characteristic digits, etc. The head and face of (87) are, however, not characteristic (or typical) as they are in (91) and (89). (87) also shows a spinal curvature (scoliosis) of some extent with a primary curve, dorsal, convex to the right (as most commonly occurs in scoliosis); the secondary, compensatory curvatures to the left in the cervical and lumbar regions are only faintly shown. A similar condition of scoliosis, occurring, however, in an adult male, was shown by Parhon Shunda and Zalplachta's Roumanian case

described in Fig. 656. She also shows scars which appear suggestive of old ulceration (possibly tertiary syphilitic) on the anterior surface of both legs.

PLATE PP (89)—(90). Aaltje B., the elder of two achondroplastic sisters belonging to a stock with achondroplasia for at least three generations. Stature 122 cm., married, normal child by Caesarian section, which lived to 9 years of age.

(91)—(92) Jauna¹ B., aged 41, height 123 cm. Like her sister a typical achondroplastic woman. Married, Caesarian section, achondroplastic female child. These two cases show the condition typically for adult females. These features have, however, been fully enumerated in the text and do not require repetition here: see for the pedigree of this achondroplastic stock Fig. 664.

PLATE QQ. See below, Section G.

PLATE RR. See above, Section D.

PLATE SS. This plate illustrates special forms of achondroplasia and its associations.

(99)—(101). These cases give a family wherein one child, the girl (100), aged 17, is a typical achondroplastic dwarf: she is mentally normal. Her brother (99), aged 13, is an imbecile. Without having any other achondroplastic character, his hands appear to present something of the form "en trident." The third sibling represented (101) is a boy of age 16 years. He is mentally and physically normal, but Dr Hunter, to whom we owe the case, says that he has an unusual shortening of the lower limbs. He suffered from diabetes for seven years. The family appears to indicate that achondroplasia may be easily associated with other signs of degeneracy.

(102). Chipeta, an achondroplastic negro dwarf. He completes the proof of the widespread character of achondroplasia—Chinese, Hindus, Negroes and Europeans are all affected. (The bird under the dwarf's arm might almost lead one to believe that the dwarf or his photographer had heard of Homer's legend (see p. 355 fn.)!)

(103). Congenital humeral micromelia in a Bantu, Yao tribe, Nyasaland. Dr Hugh S. Stannus, to whom we owe the photograph, states in a private communication that he has seen six similar cases, which form the material of a memoir by him in conjunction with Dr S. A. Kinnier Wilson, to appear shortly in the *Nouvelle Iconographie de la Salpêtrière*. The memoir discusses the relation of this condition to achondroplasia (Regnault in 1901 used the term "achondroplasie partielle" for a like state), and in three of Dr Stannus' cases there were some other features of achondroplasia. But until the publication of Dr Stannus' memoir all judgment must be suspended.

F. The Obese Dwarfs.

One may perhaps give this name to a group of dwarfs, which does not appear to have been fully examined and classified. Possibly their rarity accounts for this neglect. It is conceivable that they are related to the "myxoedème fruste" of Apert, who under this head (see Bibl. No. 469^b) has figured an extremely obese, diabetic dwarf. With the exception of Carrie Akers all the dwarfs we have come across of this type in its most marked form are historic.

PLATE TT (104). The most noteworthy sample of it is perhaps the *Ragazza gigantesca*, of whom two portraits exist in Madrid. Both were painted by Carreno di Miranda. The clothed one is in El Prado, and represents a gigantic dwarf woman in a rich brocade dress. This is reproduced in (104). The second is in the Royal Palace, and represents the same female dwarf nude as Silenus. We have not been able to procure a photograph of this picture: see *Iconography* (64^a) and (64^b). The Comtesse d'Aulnoy thus describes this gigantic female dwarf whom she saw in 1679: "Une petite naine, grosse comme un tonneau et plus courte qu'un potiron, toute vêtue de brocard or et argent, avec de longs cheveux qui lui descendaient presque aux pieds, entra et se vint mettre à genoux devant la Reine pour lui demander s'il lui plaisait de souper": see Bibl. No. 14^b. The description accords well with Carreno's picture.

(105). Carrie Akers appears to have been of the same type. Her height was 34", and her weight over 22 stone. Very few facts are unfortunately known with regard to her: see p. 361.

(106). The dwarf Barbino, who occurs in a number of bronzes, probably due to Valerio Cioli (see *Iconography* (118^{a-c})), has a body which is also a mass of fat, if not quite so imposing as the *Ragazza gigantesca* or Carrie Akers. Meige looks upon him as a case of myxoedematous infantilism; but probably judgment must at present be suspended. Annibale Caracci in a satirical composition in the National Museum at Naples (see *Iconography* (38))—a photograph of the picture has recently reached us through the courtesy of the Director) has also introduced one of these obese dwarfs, in this case with bandy legs, who is clearly painted from life. We should be very grateful for further references to the type, which would probably find its way to the show booths at fairs.

¹ Erroneously given as G. B. on Plate PP itself.

G. The Dwarf in Art.

It has been impossible, owing to the great expense involved, to represent even in the merest selection the long list of dwarfs included in our *Iconography*. All that has been feasible is to indicate in one or two groups the artistic appreciation of dwarf types at various periods, this appreciation often making a true differentiation, which was not medically expressed till a much later date.

PLATE QQ. (94) and (95) seem to suggest that myxoedematous dwarf forms were familiar to the Egyptians. (95) appears to be a dwarf form and Mace in his *El Amra*, Pl. L, 104 and 107, gives a front view, which shows well the curvature of the legs. (96) from the Ashmolean Museum, Oxford, is less certainly a dwarf type, but it indicates that these obese forms were not merely products of primitive and clumsy modelling, but represented something before the eyes of the artist. The much discussed Queen of Punt (93^a) was certainly a true experience. Suggestions have been made that she was: (i) an achondroplastic dwarf, (ii) merely a steatopygous woman, and that (iii) the peculiarity was acquired. Against (i) several points may be made, for example, she is of the same height as other figures (this might be honour due to royalty or an oversight of an otherwise singularly particular draughtsman); her hands are normal and show no signs of the typical achondroplastic stumpy hand of trident form; the daughter in (93^b) indicates features somewhat resembling those of her mother, so that the condition would suggest heredity, but parturition for an achondroplastic woman would have been difficult, if not impossible, at that date; the condition does not indicate any great disproportion of radius to humerus, etc. etc. Against (ii) Ruffer in a recent paper¹ has raised objections, the chief, I take it, being that in true steatopygia the buttocks stand out markedly behind the thighs. Ruffer also takes the view that the deformity was an acquired one. On all these counts, and especially in relation to (94)—(96), the question of myxoedema seems of some importance, and it is possible that the Egyptian jug forms may have been as much influenced by the experience of myxoedematous dwarfism as by that of achondroplasia. In that case their relation to the "obese dwarfs" would remain to be determined.

PLATE UU. In this plate are collected a number of the life-like antique bronzes of dwarfs, probably largely the product of the Alexandrian school. The best of them are in Paris, either at the Musée de Louvre or at the Bibliothèque Nationale, but some few are in Germany and England. They indicate how well known were the various dwarf types to the ancient world, and how faithfully the artists reproduced their experience.

(107) represents somewhat emaciated negro pygmies, dwarfs of the ethnic type. They may be directly compared with Plate O (1). See *Iconography* (110).

(108) gives us a dwarf achondroplastic gladiator (cf. p. 358), in juxtaposition with a Chinese achondroplastic dwarf in the "cangue," a type of pillory. See *Iconography* (113) and (114).

(111) represents a further achondroplastic dwarf warrior. See *Iconography* (112^a).

(112) is the figure of Aesop from the South Kensington Museum. He is represented as a rather obese dwarf, with marked lordosis and bandy legs, somewhat of the type of Carraci's dwarf (*Iconography*, No. 38). The bronze has been described as that of a rickety dwarf. See *Iconography* (115).

Finally in (109) and (110), we have life-like dwarf figures, full of action, presumably achondroplastic but less defined in type. See *Iconography* (112^b).

PLATE VV reproduces four of the famous pictures of dwarfs by Velasquez at Madrid.

(113) El Primo, (114) Sebastiano de Morra, (115) Antonio l'Inglese are all achondroplastic, and chiefly of interest as studies in achondroplastic physiognomy.

(116) gives Maria Barbola, an achondroplastic female dwarf, alongside Nicolasino Pertuseno, an ateleiotic male dwarf.

In the text we have referred to the long series of Spanish Court dwarfs. The fashion which collected and painted them, if idle at the time, served at least the scientific ends of a later generation whose dwarfs are not thus skilfully depicted by the great artists of their time for analysis and classification by posterity.

PLATE WW. See above, Section D.

¹ *Bulletin de la Société Archéologique d'Alexandrie*, No. 18, 1911.

Cambridge :

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(1)

Normal or physiological (racial) Dwarfism: "Pigmies" ("Akkas"; British Museum of Natural History).
Photographed for this work by kind permission of Sir Benjamin Stone.

DWARFISM OF PATHOLOGICAL ORIGIN. ACHONDROPLASIA



Twins aged 15 months. One is achondroplastic, the other of average normal growth. Photographed for this work. (Dr Robert Hutchison's Case.)



(3)

An achondroplastic girl aged 7 years and her normal sister, aged 5 years, of average height for age. Photographed for this work. (Dr Robert Hutchison's Case.)

NAWAB SALAR HING



The same achondroplastic girl, aged 7 years. Photographed for this work. (Dr Robert Hutchison's Case.)

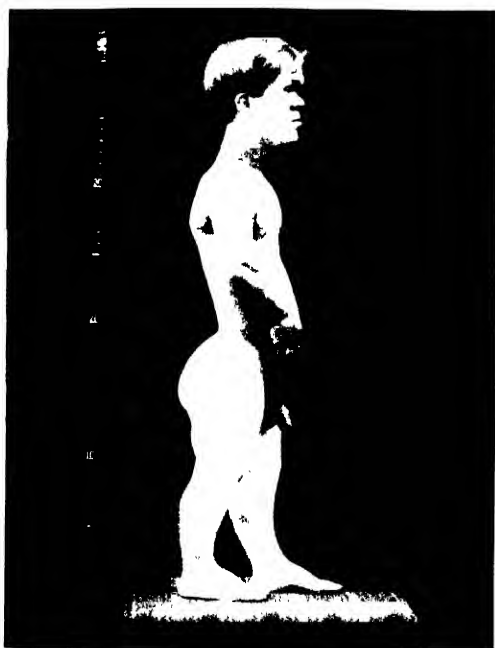


(5)

Achondroplastic and normal hands contrasted. They are those of children shown in (3). Photographed for this work. (Dr Robert Hutchison's Case.)



Achondroplastic male adult, aged 28 years.



The same adult, profile.



The same adult, front view.

(6), (7) and (8) were photographed for this work.



(8)
SWASSALA

DWARFISM OF PATHOLOGICAL ORIGIN. ACHONDROPLASIA

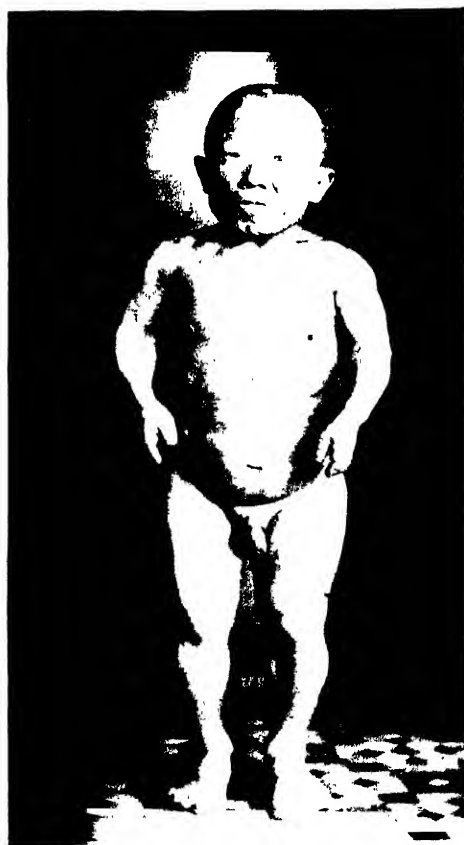


Achondroplasia in a Chinaman, aged 58 years. (Case of Dr Gordon Moir, R.N.)
Photographs (11)–(13) kindly provided by the Editor of the *British Medical*.



(12)

Posterior view of same Chinaman.



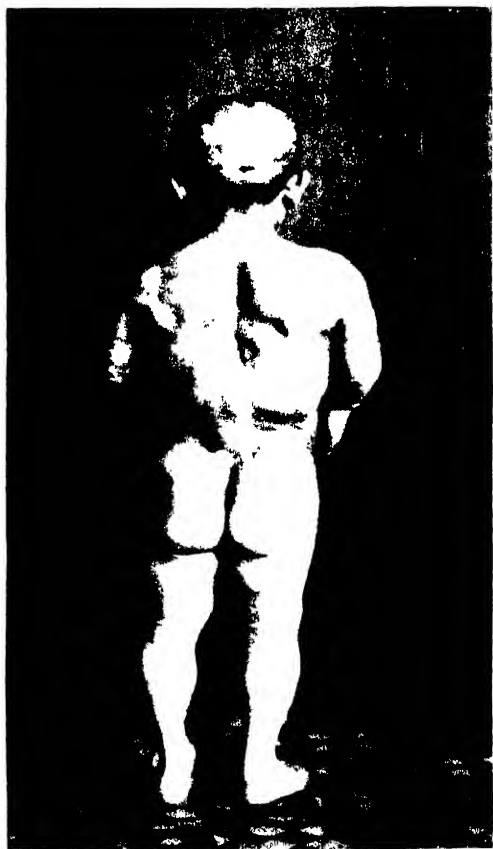
(13)

Anterior view of same Chinaman.

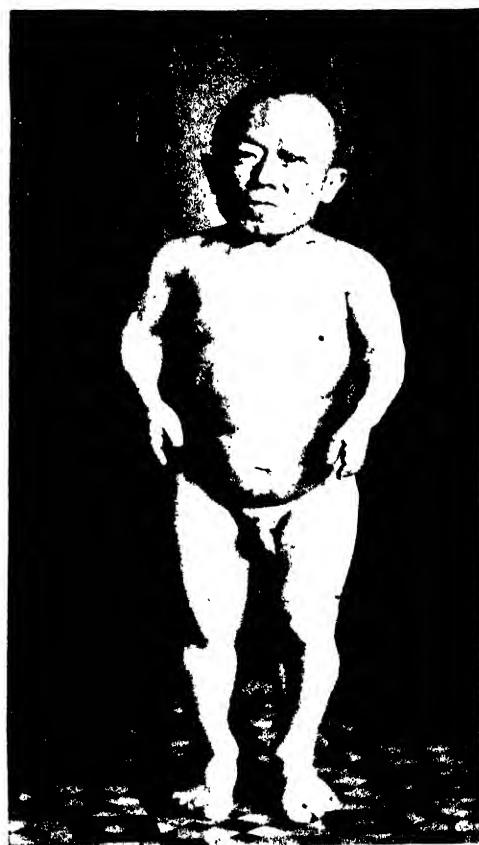
DWARFISM OF PATHOLOGICAL ORIGIN ACHONDROPLASIA



Achondroplasia in a Chinaman, aged 58 years. (Case of Dr Gordon Moir, R.N.)
photographs (11)—(13) kindly provided by the Editor of the *British Medical Journal*.



(12)

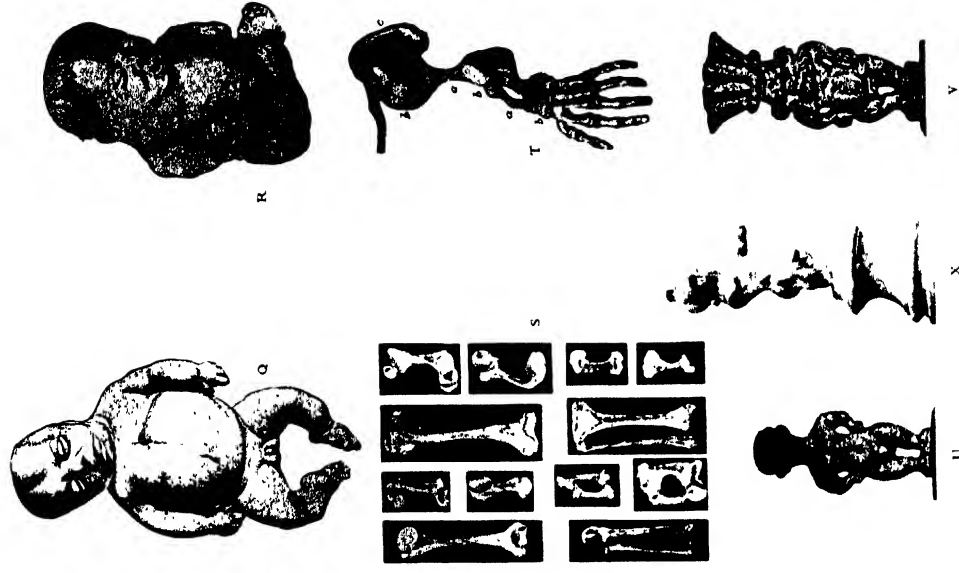


Anterior view of same Chinaman.



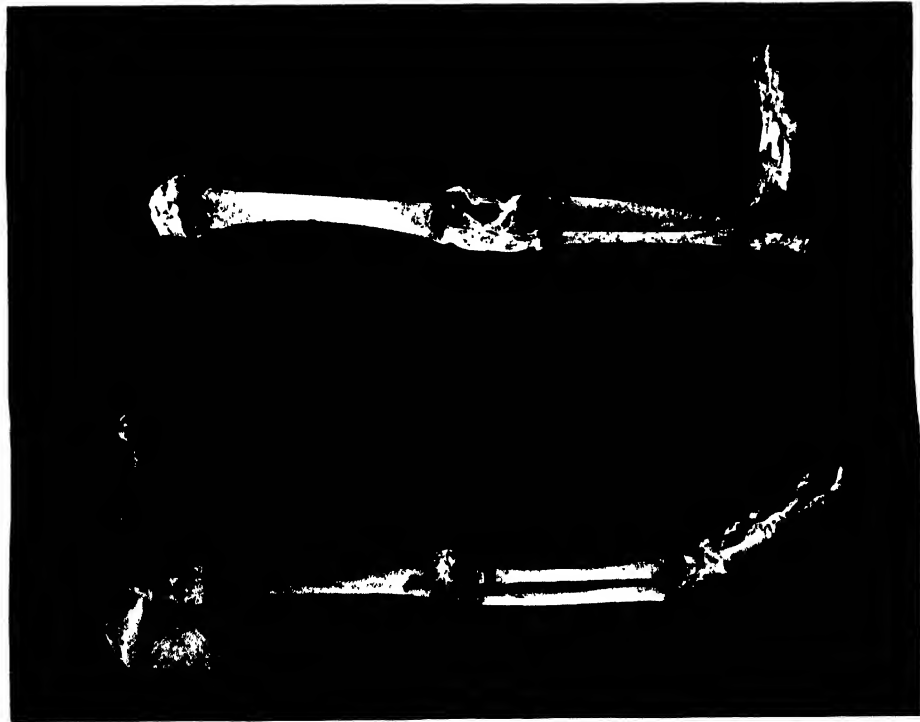
Achondroplastic Types. By kind permission of the Proprietors of the

(14)



Q & R, achondroplastic child at birth. S & T, achondroplastic bones. U & V, statues of the Egyptian gods Ptah-Sokar and Bes, and A, statuette of the Roman Emperor Caracalla in caricature. These show achondroplastic proportions. By kind permission of the Proprietors of the *Nouvelle Iconographie de la Salpêtrière*, Paris.

(15)



(16)

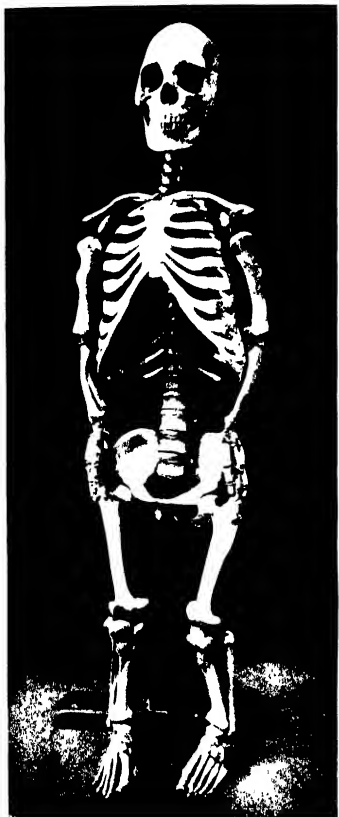
Normal.

Comparison of the bones of the extremities at birth, normal and achondroplastic. From the Museum of the Royal College of Surgeons. (The first is a dry, the second a wet preparation. Otherwise approximately to scale, $\frac{2}{3}$ natural size.)

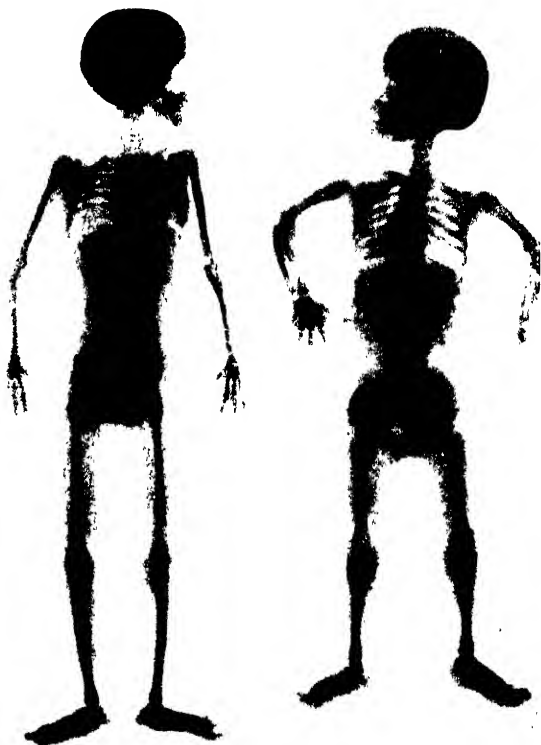


(17)

Achondroplastic.



Skeleton of an achondroplastic adult. From a photograph belonging to the Royal College of Surgeons.



(19)

Radiograms of the skeletons of achondroplastic and normal girls of 9 years. By kind permission of the Proprietors of the *Nouvelle Iconographie de la Salpêtrière*.



Pseudo-achondroplasia, rickety foetus.



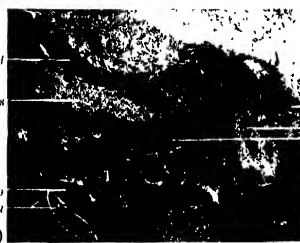
Normal foetus.



Achondroplastic foetus.



Normal chondral ossification.



Achondroplasia. Longitudinal section of upper epiphysis of femur.



Congenital Rickets (pseudo-achondroplasia).



Periosteal Dysplasia.

(20)—(26) are reproduced by kind permission of the Proprietors of the *Nouvelle Iconographie de la Salpêtrière*, Paris.



Radiograms of hands in the achondroplastic adult.



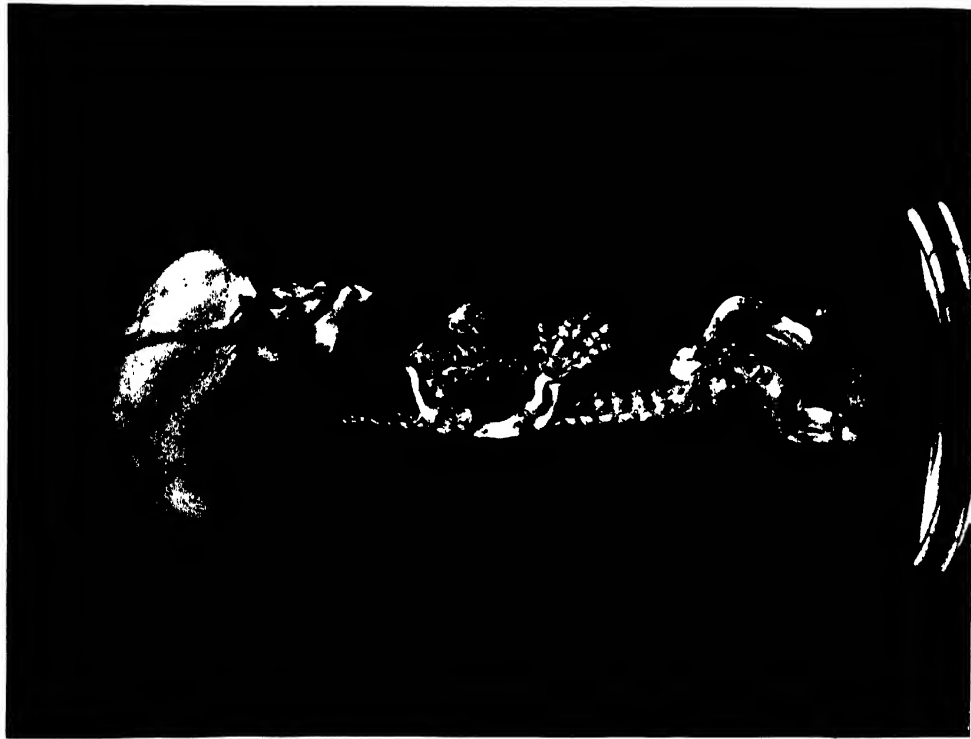
Radiograms of feet in the achondroplastic adult.

(18)



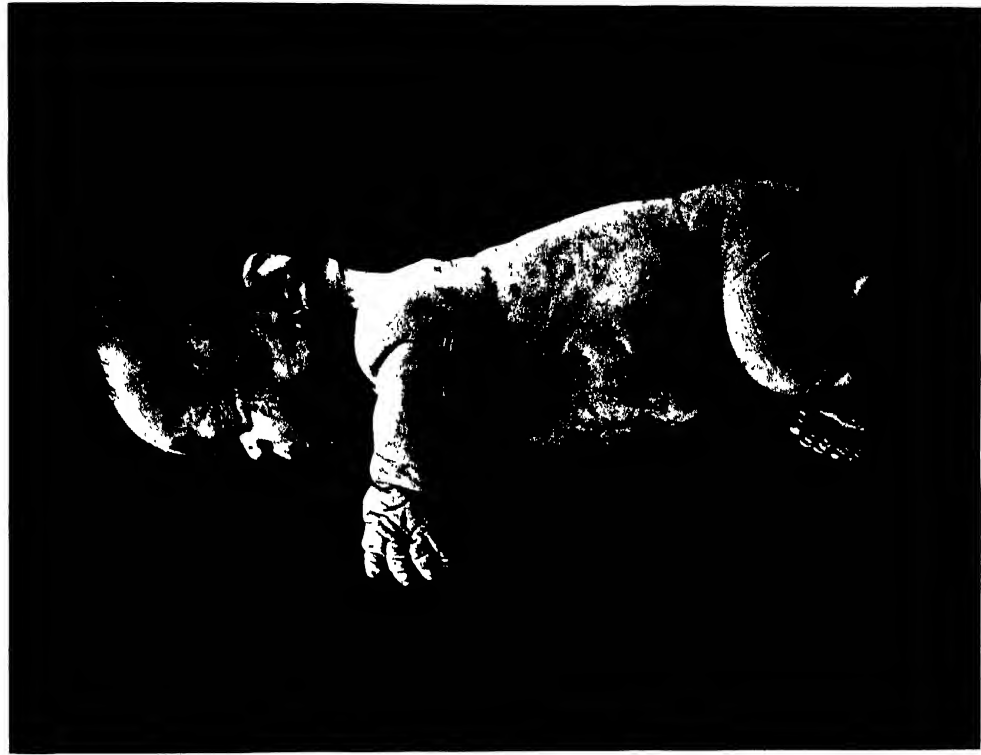
Radiogram of cranium in the achondroplastic adult.

By kind permission of the Proprietors of the *Nouvelle Iconographie de la Salpêtrière*, Paris.



(30)

Skeleton of achondroplastic foetus at full term
Museum of Royal College of Surgeons



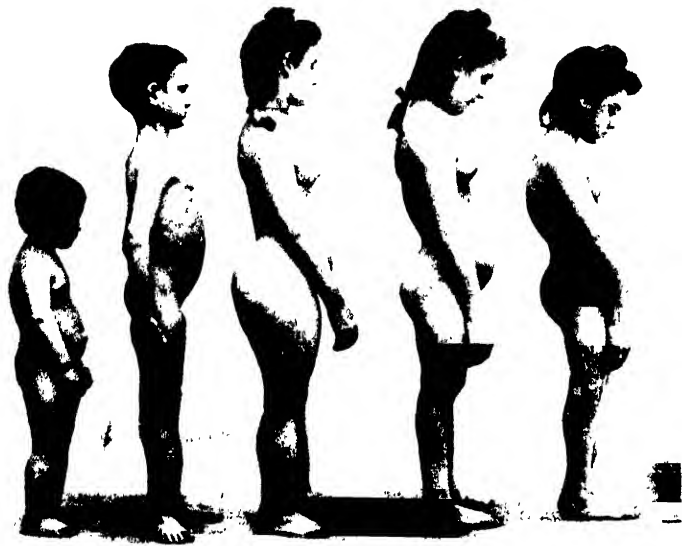
(31)

Achondroplastic foetus at full term (of female sex, as is the rule).
Museum of Royal College of Surgeons

DWARFISM OF PATHOLOGICAL ORIGIN. ACHONDROPLASIA



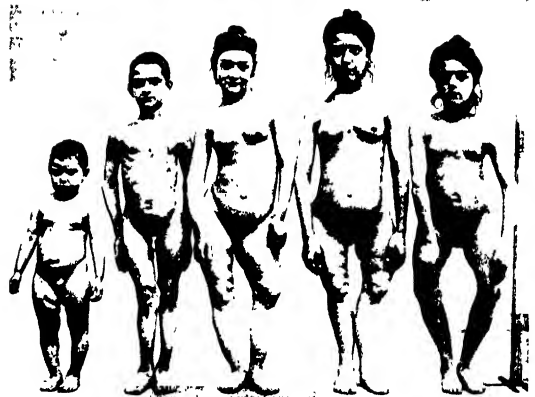
Radiogram of achondroplastic foetus at full term. From a specimen in the Museum of the Royal College of Surgeons.
By kind permission of Professor Arthur Keith.



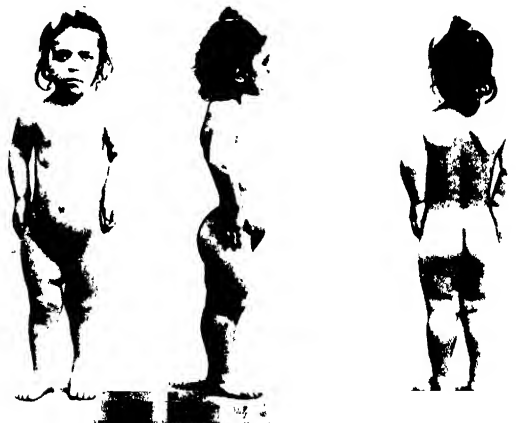
(33)



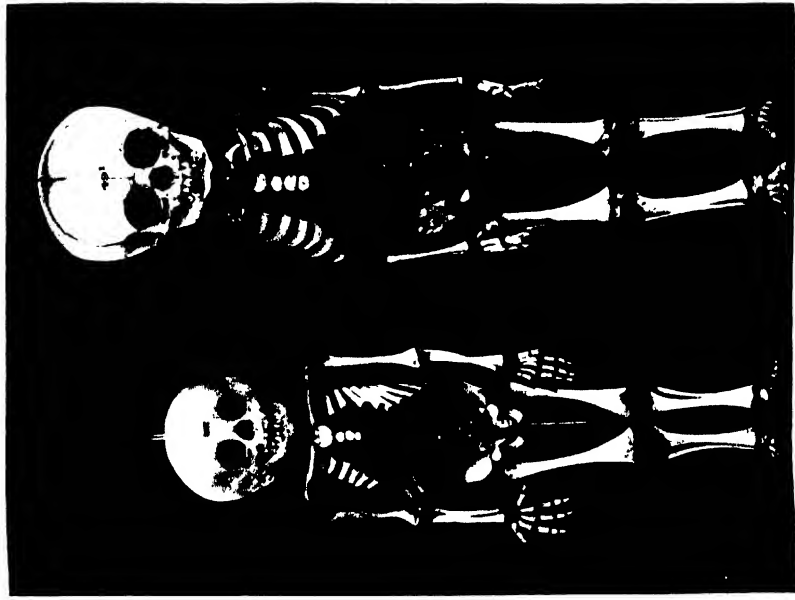
(34)



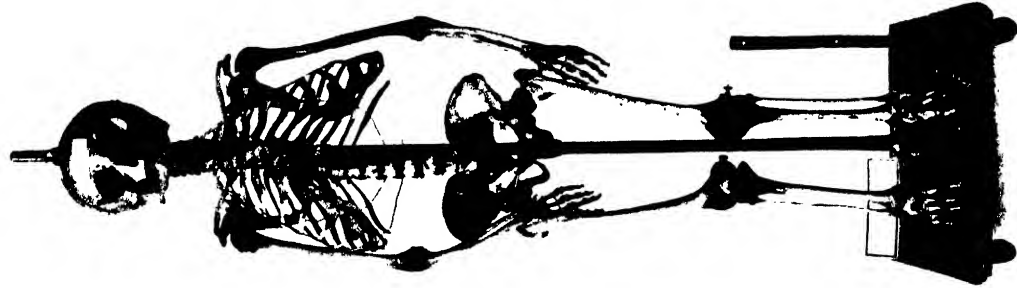
(33)—(35). The deformity and dwarf growth of rickets shown in a case of family rickets. Bizarre curvatures and deformities of b due to bending of softened bone under weight. Pseudo—not true micromelia. Contrast (6)—(8), (11)—(13) and (14).



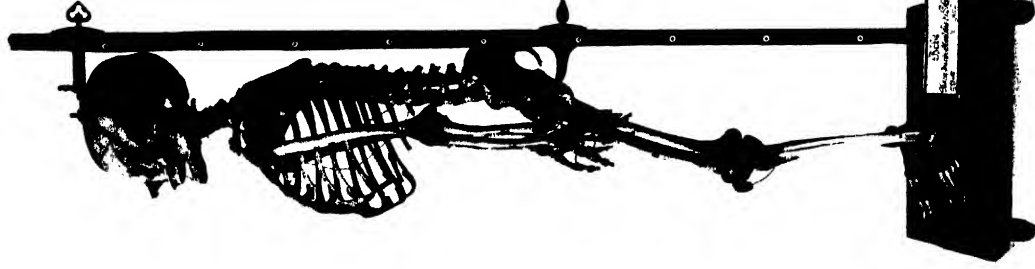
The dwarf growth and proportions of achondroplasia (37) contrasted with those of infantile myxoedema (36). (33)—(37) are reproduced by kind permission of the Proprietors of the *Nouvelle Iconographie de la Salpêtrière*, Paris.



(38)
Skeleton of a child of 9 years (ateleiosis), height 191", with a skeleton of a normal child of 16 months, height 231". Photographed for this work from the originals in the Royal College of Surgeons.



(39)



(40)

Skeleton of Bébé, Nicholas Ferry, Dwarf of King Stanislas of Poland. Ateleiosis in a male, who died aged 20 years. Height 92.5 cm. (36.4"). From photographs taken for this work from the original in the Muséum d'Histoire naturelle, Paris, by the kind aid of Professor Dr Verneau

DWARF GROWTH OF PATHOLOGICAL ORIGIN. ATELEIOSIS. GROUP II



(41)

Ateleiotic male, aged 28 years, height 12",
with a normal boy aged 6 years.



Ateleiotic female aged 18 years, height 23½"



Twenty cases of ateleiosis (Group II).

Photographs (41)- (43) are reproduced by kind permission of Mr Hastings Gilford and the Proprietors of the *Transactions of the Medico-Chirurgical Society, London.*



(44)

A woman aged 70 years and her ateleiotic daughter aged 26 years, height (in shoes) 45".



(45)

Three brothers, two ateleiotic, aged 24 and 22 years, height of each of these 40" (without shoes).



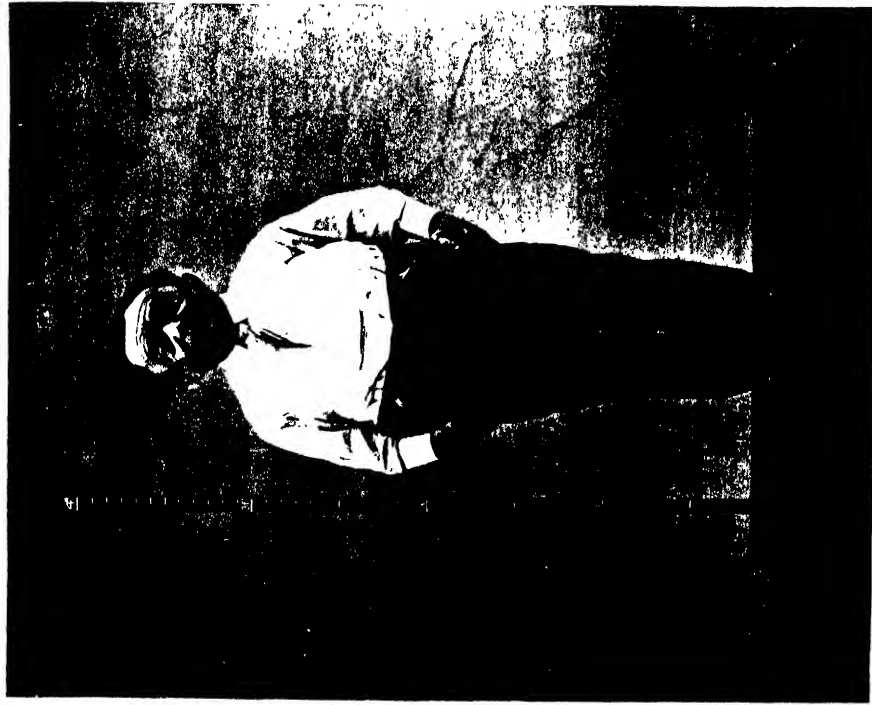
(46)

Ateleiotic female, aged 28 years, height (in shoes) 43.2".



Three ateleiotic siblings. Male, aged 30 years, height (in shoes) 43.2"; females aged 26 and 14 years respectively, heights 37.2" and 34.4" respectively.

The Tyrolese dwarfs (44) - (47) are reproduced for this work from photographs most kindly sent to K. Pearson by Dr. Schmolek. Cf. *Vicars' Archiv*, Bd. 187, S. 105, 1906.



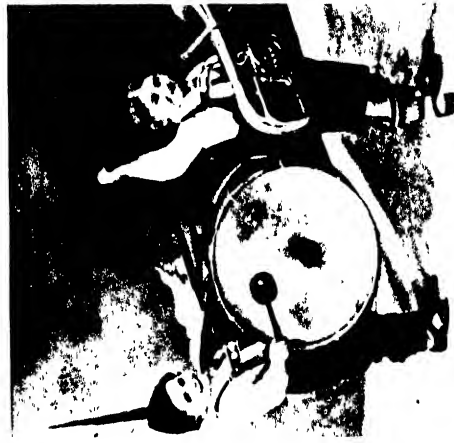
(48)

Ateleiotic male, aged 62 years, height in shoes 45".
Photographed for this work.



(49)

Ateleiotic male, aged 22 years, height in shoes, about 39".



(50)

Two ateleiotic brothers, aged respectively 24 and 20 years,
of approximate height 36".
(49) and (50) are reproduced by kind permission of M. Nicol Gerson,
Dissident of "Tiny Town," Olympia, London, 1909—10.



(50)



Ludwig Ullrich, a German. Ateleiotic male, aged 18 years.
Height in shoes 34" approximately.



(52)

Otto, a German. Ateleiotic male, aged 21 years.
Height in shoes 36" approximately.



(53)



Forçères, a Frenchman. Ateleiotic male, aged 35 years.
Height in shoes 45" approximately.



(54)



Shuau Sung H'poo, a Burman. Ateleiotic male, aged 26 years.
Height in shoes 37" approximately.

(51)—(54) are reproduced from photographs kindly lent by M. Nicol Gerson, Proprietor of "Tiny Town, Olympia, London, 1909—10

DWARF GROWTH OF PATHOLOGICAL ORIGIN. ATELEIOSIS. GROUPS II AND III



(55)

Four dwarfs belonging to Group II. Females aged 30 and 26, males 28 and 23. Reproduced by kind permission from a photograph by Messrs Porter Brothers of Hampstead.



(56)

Ateleiotic male, aged 36 years.
Height (in shoes) 56" approximately.



(57)

Ateleiotic male, aged 28 years.
Height 57 5", with normal brother aged 13 years.



(58)

Ateleiotic male, aged 52 years.
Height 56" (in shoes) approximately.

(57) is reproduced by kind permission of Mr Hastings Gifford and the Proprietors of the *Transactions of the Medico-Chirurgical Society*, London.



(56), (58) and (59) are reproduced by kind permission of M. Nico Gerson, Proprietor of "Tiny Town Olympia" London, 1909-10. (50 to (59) belong to Group III.

(59)

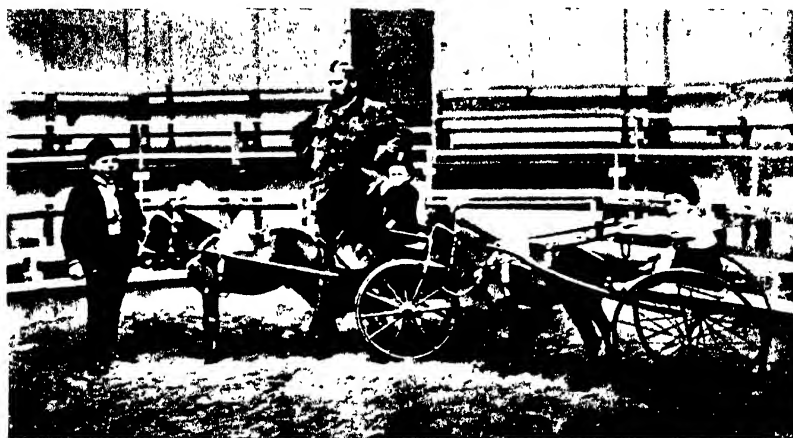
Cases of Groups II and III compared, the smaller figures are those of (50) and (52), the larger those of (56) and (58).

DWARF GROWTH OF PATHOLOGICAL ORIGIN. ACHONDROPLASIA AND ATELEIOSIS



(60)

Large group of ateleiotic cases and four cases of achondroplasia. The latter may be recognised by their large heads and adult faces. The man in the background is 76" in height.



(61)

Ateleiosis in the equine species. The two small human dwarves are figured in (50) and (52). The larger human dwarf belongs to Group III. The man in the background is 74" in height.



(62)

Ateleiosis in father and son, the latter is shown in (51) and (61). The mother is achondroplasia. (60) to (62) are reproduced by kind permission of M. Nicol Gerson, Proprietor of "Tiny Town," Olympia, London, 1909-10.



(63)



(64)

The dwarfing of cretinism for contrast with the achondroplastic and ateleriotic cases (particularly the latter) figured in the preceding plates. Note in the female the goitrous enlargement of the thyroid gland. From photographs most kindly provided by Professor G. R. Murray.



(62)

Hungarian Dwarf. From a photograph, by kind permission, of Messrs. Mendelssohn, Mademoiselle Anita.



(66)

Queen Henrietta Maria's Dwarf. From a photograph of the picture in the National Portrait Gallery, by kind permission of the London Electrotype Agency. Jeffrey Hudson.



(68)

The Borowluski Statue by Bonomi in the Museum, Durham. The youth standing beside it is 5 ft. 10 ins. in height. See Iconography No. 122.



(69)

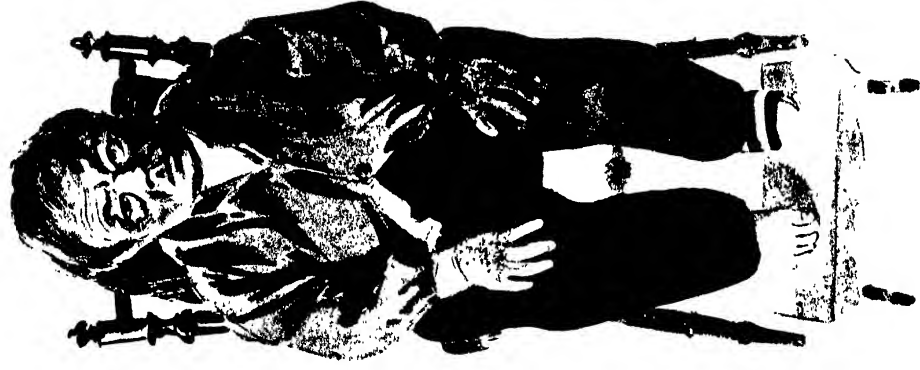
(69)

Nannette Stocker and Johann Hauptmann. Reproduced from

Thérèse Souvray, "Madame Bébé



(71^a)
Balhazai Zimmermann. According to Regnaud he was a myxoedematous Dwarf. Reproduced by kind permission of the proprietors of *La Nature* (T. XXV p. 180) see Bibl. Nos. 232 and 411.



(71^b)
Dutch myxoedematous Dwarf from a water colour in the possession of W. Bulloch, M.D.



(72)
Four myxoedematous Dwarfs, children of the same parents. From a block most kindly provided by M. le Dr. A. Marie. See Pedigree 837



(73)

George Romondo, Jewish rickety Dwarf and Eccentric Mime. Reproduced from Kirby's *Wonderful Museum*. See Iconography No. 156^b.



Owen Farrel, the achondroplastic Irish Dwarf. Reproduced from Kirby's *Wonderful Museum*. See Iconography Nos. 155 & 158.



Ages	16 $\frac{1}{2}$	14	11 $\frac{1}{2}$	9	4 $\frac{1}{2}$	6 $\frac{1}{2}$	(75)
Statures	97.1	102	95.5	92	100	116 cm.	

The first four ceased to grow in their 11th year.

The family Kostesky. Russian ateleiotic Dwarfs. Reproduced by kind permission of the Proprietors of *La Nature* (T. XXIX, p. 181). See Bibl. No. 232 and Pedigree No. 744.



(78)



(77)

a *b* *c* *d* *e* *f*
(*a*) Cretinous Dwarf, (*b*) and (*c*) Ateleiotic Dwarfs, (*d*) and (*e*) Achondroplastic Dwarfs, (*f*) Normal Native.





(79)



(No)

Major C. H. James' Case. Lachun Naram, Achondroplastic Dwarf, aged 48 years, 36 inches. European 75 inches, Native Faqr, 67 inches in height.

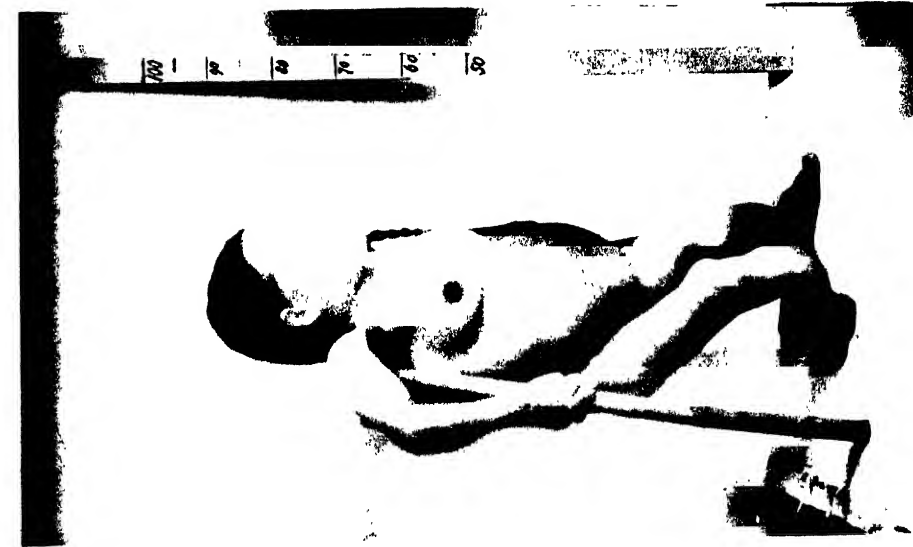


Cashmere Giant (93 inches), normal European, two achondroplastic Dwarfs, and the Patiala midget (ateleiotic, 28 inches). From stereograph, copyright, Messrs Underwood and Underwood, London and New York.

TREASURY OF HUMAN INHERITANCE.
DWARF GROWTH OF PATHOLOGICAL ORIGIN.

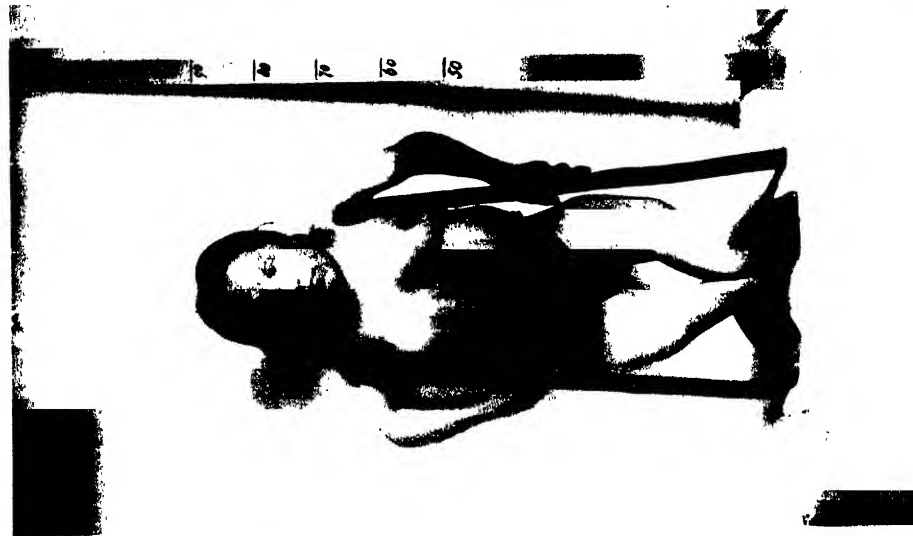
PLATE NN

DWARF GROWTH OF RICKETS

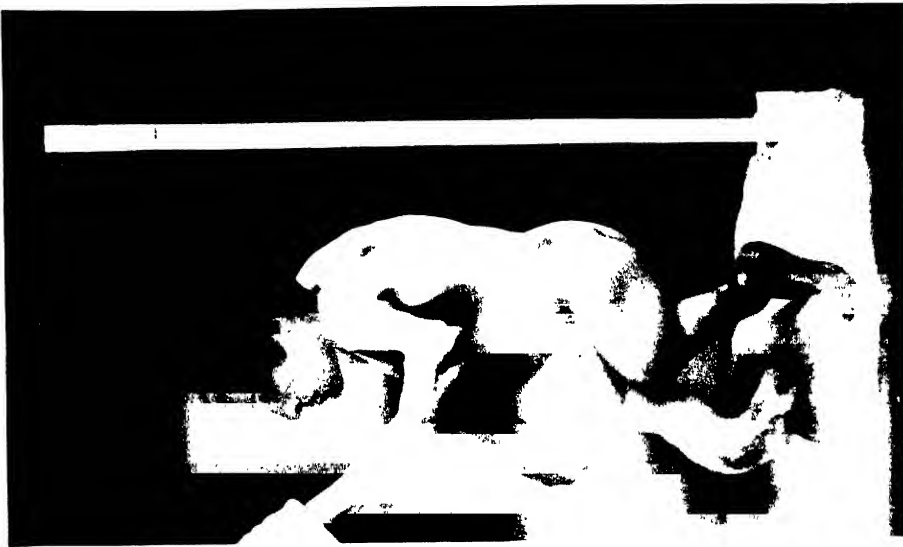


(81)

M.B. Aged 40. Stature 86 cms. Sæctio caesarea.
The Dwarf Growth of Rickets, associated with multiple rickety curvatures of the long bones of the lower extremities, occurring in sister and brother.

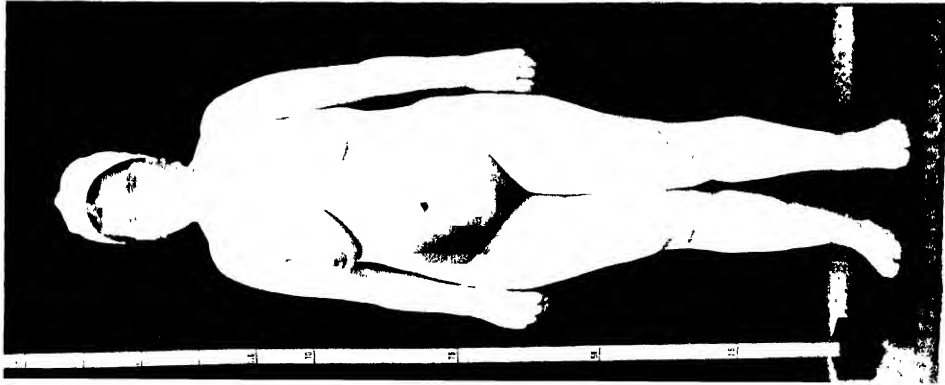


(82)

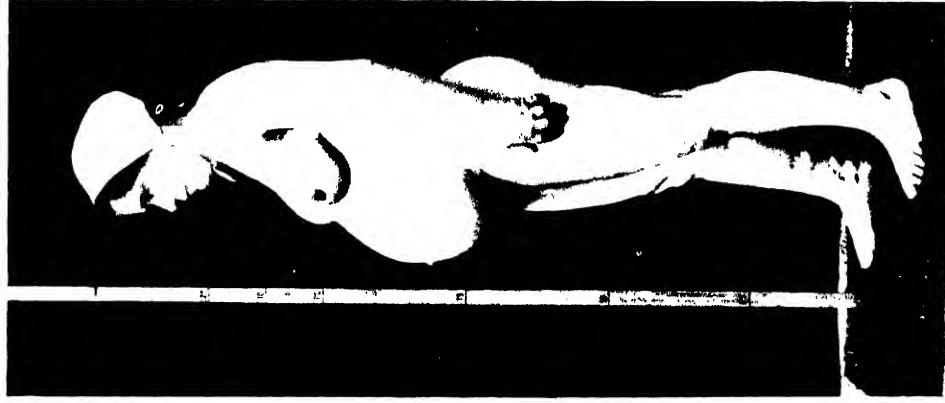


(83)

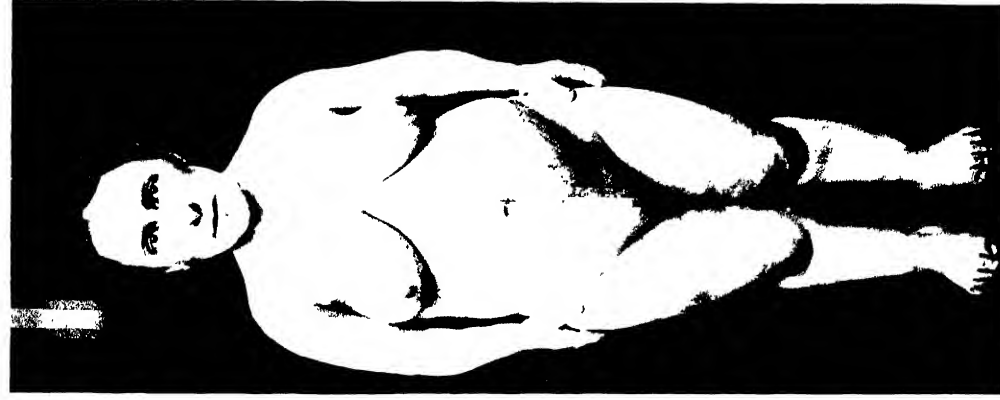
Brother to M.B. Stature 96 cms.
By the kindness of Professor Nijhoff of Groningen.



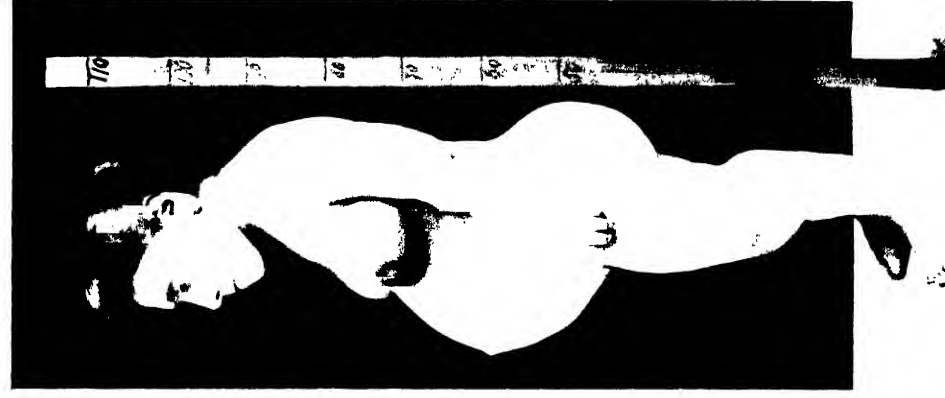
(85)
A. J. Rachitic Dwarf. Stature 143 cms. Aged 35. 1st Parturition, craniotomy;
2nd and 3rd, sectio caesarea.



(87)
A. T. Achondroplastic Dwarf. Aged 27. Stature 111 cms. Sectio caesarea,
normal ♂ child.

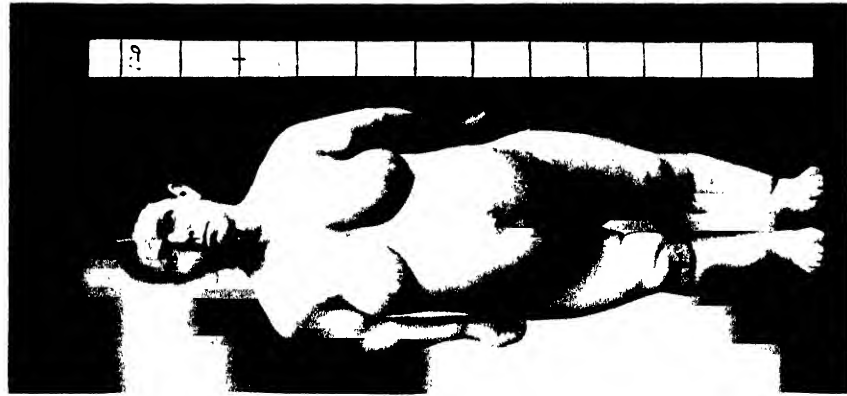


(88)
A. T. Achondroplastic Dwarf. Aged 27. Stature 111 cms. Sectio caesarea,
normal ♂ child.

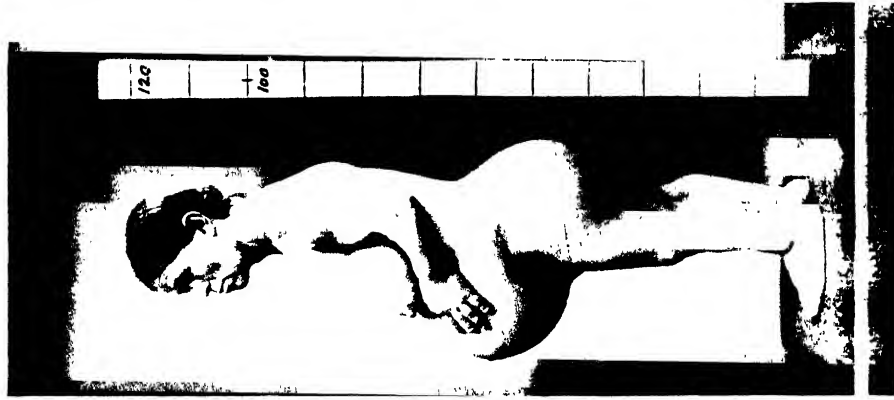


(88)
A. T. Achondroplastic Dwarf. Aged 27. Stature 111 cms. Sectio caesarea,
normal ♂ child.

By the kindness of Professor Nijhoff of Groningen.



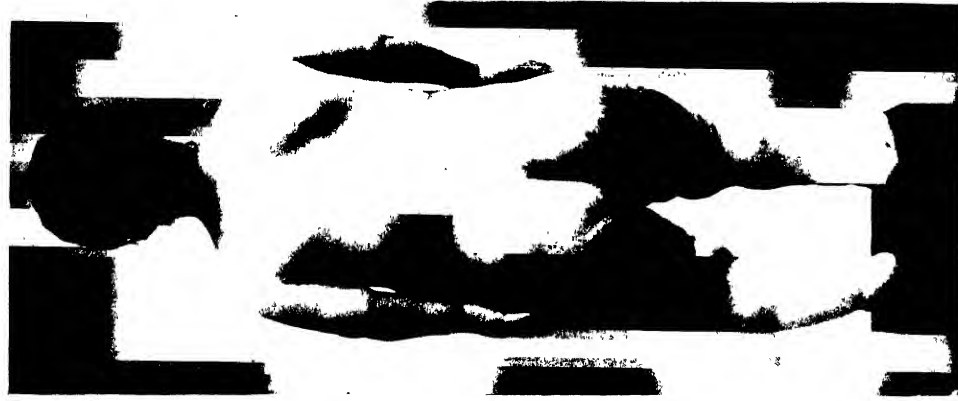
(80) A. B. Aged 1. Stature 122 cms.



(90) Sectio caesarea, normal ♀ child.
 Two achondroplastic sisters, with achondroplastic father and four achondroplastic siblings.



(91) G. B. Aged 41. Stature 123 cms. Sectio caesarea. Achondroplastic ♀ child.
 By the kindness of Professor Nijhoff of Groningen.



(92)



(94)

of Ptah from a Bas-Relief, at Dender el-Bahari n.c. 1516—1481 to be considered in conjunction with jug forms below.



This outline sketch after Mariette of the Bas-Relief shows the dwarf the Queen of Ptah with sensible but less marked hereditary characteristics.



Jug from British Museum, No. 29935.

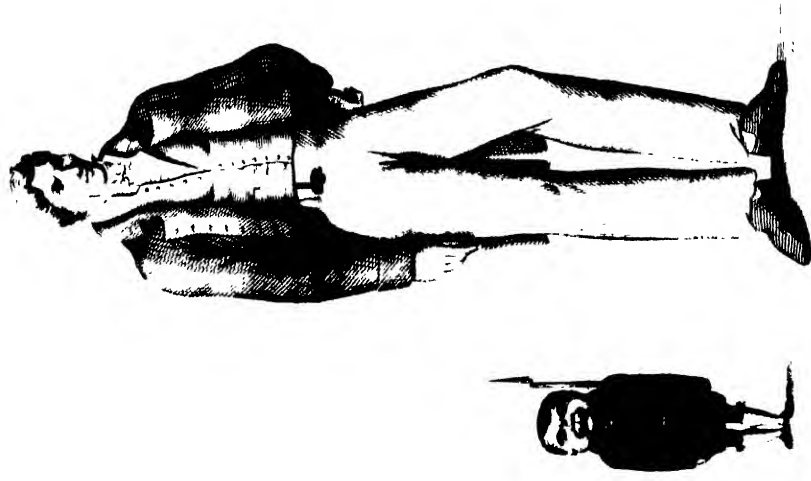


(95)

Jug from Cairo Museum. See Mace, *El Amra*, Plate L.



Asinoleum Museum, E. 2427. See Gar, *El Arabah*, Plate XIX.



MR SIMON PAAP.

2' 8". 5 inches high

MR JAMES TOLLER,

Aged 47 years
5' 8". 3 inches high

From *Scientific American*, No. 10, 1874. Also *Scientific American*, No. 10, 1874.

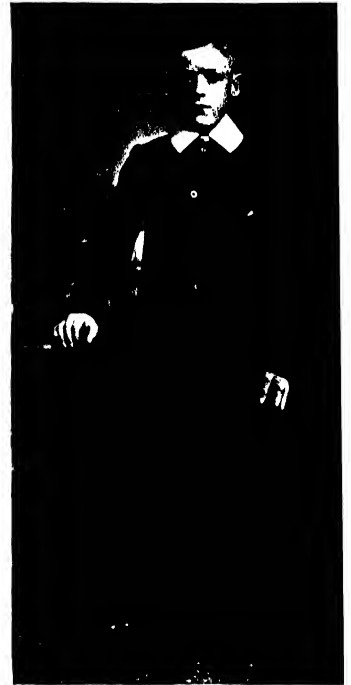
(67)

The Dwarf Simon Paap, alongside the Giant Toller, reproduced from Kirby's *Illustrated Magazine*, No. 156. Unless the drawing is very poor, the macrocephaly of this atrophic dwarf must have been a marked feature.



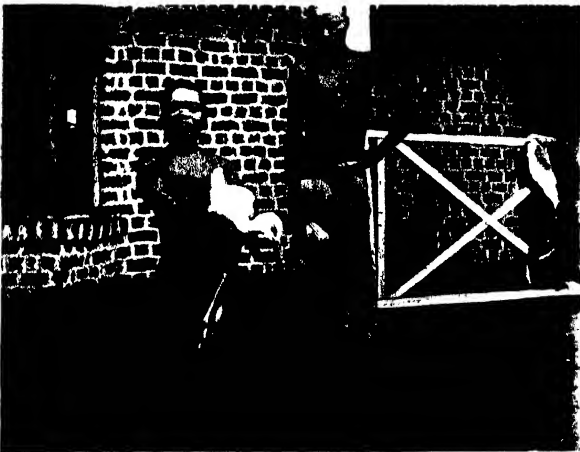
Nicholas Ferry, Bebe, aged 18. From a wax model in Bebe's clothes with a wig of his own hair prepared by Jomier his surgeon. see Iconography, No. 121. Photographed from the original in the Musée Dupuytren, Paris, for this work.

(68)



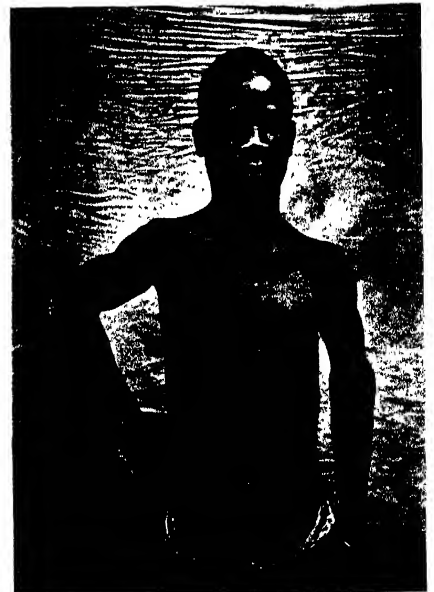
(100)

Dr D. W. Hunter's Case. The C. Family. Pedigree 632. H. C. (100), aged 17, achondroplastic dwarf, mentally normal. W. C. (99) aged 13, imbecile. Compare his hands with the "mains en trident" of H. C. A. C. (101), aged 16, normal. Suffered from diabetes for 7 years. Dr. Hunter draws attention to the shortening of the lower limbs in A. C.



(102)

Chipeta, an achondroplastic dwarf from Nyasaland. Photographed by Dr W. Murray; provided through the kindness of Dr Hugh S. Stannus.



Congenital humeral micromelia (partial achondroplasia?) in a Bantu, Yao Tribe, Nyasaland. From a photograph most kindly provided Dr Hugh S. Stannus



Ragazza gigantesca by Carreno, Madrid. See Iconography
No. 64 and Bibl. No. 14. Anderson Photo.



Carrie Akers after Gould and Pyle. Height
31", weight over 22 stone. See p. 361 above.

(104)

(105)



The Dwarf Barbino by V. Cioli, Florence. See Iconography No. 119. Alinari photo.

Possibly cases of "Myxoedème fruste" (Apert); see Bibl. No. 469. Cf. also Plate Y (36). A photograph of the Carrache Dwarf, Iconography No. 38, which has just reached us shows that it also belongs to the class of Obese Dwarfs.

(106)



(108)

Achondroplasia Dwarfs. Dwarf Gladiator and Dwarf in Cangue. Collection Oppenheim, Bibliothèque Nationale, Paris. Photo Giraudon



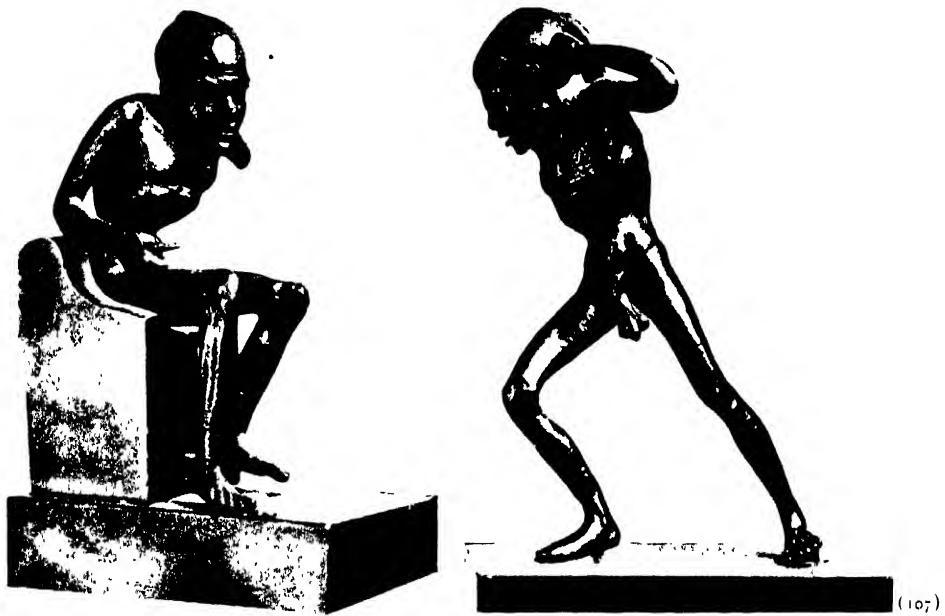
(111)

Achondroplasia Dwarf Warrior. Musée de Louvre. Photo Giraudon.



(112)

Aesop as (b) rickety Dwarf. From the South Kensington Museum. Cf. Plate QQ (95).



Ethnic Dwarfs. Negro Pygmies. Collection Thiers, Musée de Louvre. Photo Giraudon.



Dwarf Types— 1 Achondroplasia. Musée de Louvre. Photo Giraudon.



Dwarf Type— 1 Achondroplasia. Musée de Louvre. Photo Giraudon.

